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COMPUTERWORLD

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VOL. XIX, NO. 52/VOL. XX, NO. 1

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Cautious optimism marks analysts' views of year end/**105**

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ETA Systems, Inc. sold a supercomputer that has not yet been announced. **Page 103.**

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Will IBM-compatible micros run on the Token-Ring network? **Page 98.**

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Some unusual software packages of 1985 underscore inventiveness in the industry. **Page 93.**

■

Layoffs are "almost guaranteed" at networking products manufacturer Corvus Systems, Inc. following the troubled company's recent merger with IBM Personal Computer-compatible maker Oemtek, Inc., knowledgeable sources said. Indications are that up to 150 of Corvus' 550 workers could be laid off anytime soon. A Corvus spokesman denied the layoff rumor, but in December the company said sales for the quarter just ended were less than 50% of those of the year-earlier period, resulting in a $4.6 million loss.

■

Adobe Systems of Palo Alto, Calif., seems to be on its way to setting a de facto standard in printer communications software before there is even much competition. Adobe's Postscript, the language of choice for Apple's Laserwriter, was recently selected by DEC for as-yet-unannounced printer products, and sources indicate that Hewlett-Packard is one of those considering Postscript for its high-end laser print-

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CW EXCLUSIVE

Word power: Mass. agency shifts standard

By Rosemary Hamilton

A Massachusetts state agency's recent experience in selecting a new agencywide word processing software standard provides a rare glimpse at how an organization weighs and judges competing computer products.

The situation also illustrates the obstacles to implementation, once a switch in standards occurs, that organizations frequently face as they make the change from one basic software application to another.

The Massachusetts incident involves the state Bureau of Systems Policy and Planning and its decision to use Microsoft Corp.'s Word program as its word processing standard, replacing Multimate 3.3 from Multimate International Corp. of Hartford, Conn., now a subsidiary of Ashton-Tate. Although senior BSPP managers see Word as having superior long-term benefits, its selection, following an exacting evaluation process, caused short-term difficulties as the staff reacted to change.

"Some people still want Multimate. But we're going to make Word work," said James Corum, director of BSPP.

A division of the Office of Management Information Systems, which is governed by Massachusetts' Executive Office of Administration and Finance, the BSPP awards hardware and software contracts to vendors for the 178 state agencies in Massachusetts. It monitors vendors and provides technical advice to other agencies by determining equipment requirements.

Both Corum and Michele Dorr, the BSPP senior analyst who headed the

See **MASS.** page 4

VM software niche grows

IBM neglect, user need boost independent firms

By Bryan Wilkins

WASHINGTON, D.C. — Independent software companies, responding to heavy user demand, have carved out a lucrative market supplying utilities that improve the performance of IBM's VM operating system. In some cases, users are actually assisting these companies in the development of new products.

This trend, which apparently surprised IBM with its extent and intensity, has prompted the industry giant to show new strategic interest in the once-neglected product. IBM has consequently begun to deliver a wide array of VM-related products across several hardware lines, in ad-

See **VM** page 6

Scanner puts text on-line

By Peggy Watt

MILPITAS, Calif. — A low-cost optical scanner that takes only 30 seconds to convert a page of standard printed text to an on-line file, formatted for most word processing programs, is set to debut this week from Dest Corp.

The scanner, called PC Scan, will be introduced along with the first in a line of accompanying software, Text Pac, that recognizes most common typefaces used in business documents. Priced at less than $3,000, the optical reader equipment supports printer output at 300 dot/in., matching the quality of most low-cost laser printers.

Future software for use with PC Scan

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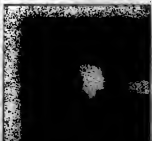

Industry climes: Forecast '86

On page 17 of this special double issue, you will find *Computerworld's* annual year-end Forecast section, in which staff editors and senior writers assess recent trends and forthcoming developments across the spectrum of computer applications.

Forecast '86, CW's traditional look ahead, focuses on concerns as diverse as the brewing winds of international trade war and the hoped-for panacea for programmer productivity ills. The special section also explores the strategies that semiconductor and mainframe makers will employ to rally in 1986. An inside look at how the slump of 1985 slammed one high-flying workstation vendor provides insights into the tough times for high technology.

Special features in this year's section include "Outlooks '86," a series of comments from leading analysts and opinion makers on the shape of things to come. Applications integration and micro-mainframe links also come under the microscope of Forecast '86. And you'll learn how emerging technologies are transforming microcomputers into more than just personal computers. The issue also sheds light on how users are coming to grips with the cornucopia of communications options. Forecast '86 shows how AT&T has focused on the computer market and how General Motors Corp.'s Manufacturing Automation Protocol will fare. And, finally, users can view the high-tech world from the perspective of Capitol Hill.

DP policy for federal agencies issued by OMB

By Mitch Betts

WASHINGTON, D.C. — The U.S. Office of Management and Budget (OMB) has adopted a sweeping policy document that establishes rules for the management of federal DP systems and the dissemination of government information to the public.

Many of the policies were designed to cut costs and make government computer management more businesslike. The U.S. government is spending about $15 billion a year on information systems, the OMB said.

The final version of the document, called Circular A-130, requires federal DP managers to recover DP costs from all users, share computer facilities with other agencies, acquire off-the-shelf software whenever possible and improve computer security.

The document said government officials should feel free to obtain DP services from any low-cost source in the public or private sector, not just the central DP operation within their own agencies. The OMB explained that "monopoly" DP offices inside the agencies have little incentive to control costs.

The OMB also urged agencies to charge user fees for government reports and to rely on private sector vendors of information services to disseminate government information, the latter position supported by the Information Industry Association.

The draft of the circular [CW, March 4] was highly controversial and elicited 350 written public comments, according to an OMB count. Most of the comments criticized the OMB for what was perceived as an attempt to restrict the flow of government information to the public.

Critics, including scores of librarians and some businesses, complained that private publishers and data base vendors charge higher prices and may not find it profitable to sell some little-known government reports. Critics also expressed concern that members of the public may have to buy computer equipment to retrieve government data in electronic information systems.

In response to the controversy, the OMB toned down some language in the circular but retained the basic policy decisions. The final circular stated that agencies should disseminate information only when necessary for the performance of government functions, avoid duplication, impose user charges where appropriate and disseminate information with "maximum feasible reliance on the private sector."

Research shows 20 states tax software sales

Taxes vary with states' classification of software

By Mitch Betts

In the U.S., 20 states now impose a sales tax on custom computer software programs, and 44 states and the District of Columbia levy a sales tax on off-the-shelf software, according to Commerce Clearing House, Inc. (CCH), a tax research firm in Chicago.

CCH reported that the methods states use to apply their sales taxes vary greatly because computer software is not easily categorized as tangible or intangible property, since the value of the software usually exceeds the value of the magnetic tape or disks.

States trying to tax sales of software generally classify software as tangible property, whereas other states generally classify software as intangible property or as an incidental part of a service, CCH reported. Furthermore, many states distinguish between canned or off-the-shelf software and custom software, CCH said.

State definitions vary

State definitions of custom software vary, so the term may refer to a canned program modified to meet a particular customer's needs or to a totally individualized program, CCH said.

According to CCH, the states that tax custom programs are Arkansas, Connecticut, Georgia, Hawaii, Idaho, Kansas, Kentucky, Mississippi, Nebraska, Nevada, New Mexico, Ohio, Rhode Island, South Carolina, South Dakota, Tennessee, Virginia, West Virginia, Wisconsin and Wyoming.

Alaska, Delaware, Montana, New Hampshire and Oregon do not impose any sales taxes. Of the other 45 states and the district, only Illinois totally exempts off-the-shelf programs from its sales tax, according to CCH.

The CCH study noted several states with special exemptions to their sales taxes.

For example, the states of Colorado, New Jersey and New York do not tax an off-the-shelf software product if it requires modification or if the selection of the software requires an analysis of the customer's requirements, and Georgia's tax code exempts software written to a customer's specific needs and at the customer's place of business.

Cost of leased equipment to rise

WASHINGTON, D.C. — AT&T Information Systems said recently that it intends to raise its leased business equipment rates as well as offer new long-term contracts. Prices on some types of equipment will jump as much as 20%, AT&T Information Systems said. The new rental rate would go into effect Feb. 1.

An AT&T spokesman said that the equipment subsidiary of AT&T is also considering raising residential equipment rental rates.

Brian Moir, counsel to the International Communications Association, which represents large users, said that business has known for the last two years that the rental price stability contracts would be expiring in 1986. "They've been on notice all along," Moir said.

He said users of the old equipment had three options: to negotiate new fixed-price contracts, to replace or upgrade existing equipment at new terms or to go to a third-party supplier.

AT&T Information Systems said its new policy would offer users the option of leasing from one to four years, with a longer lease resulting in lower rental costs.

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Odesta introduced Double Helix, an application environment for the Apple Macintosh/ **96**

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The increasing number of personal computers and the need to provide terminal users with access to multiple hosts have become the driving forces behind the development of local communications options/ **99**

AT&T began construction of a $400 million network dedicated to a single-customer — the U.S. Department of Defense/ **99**

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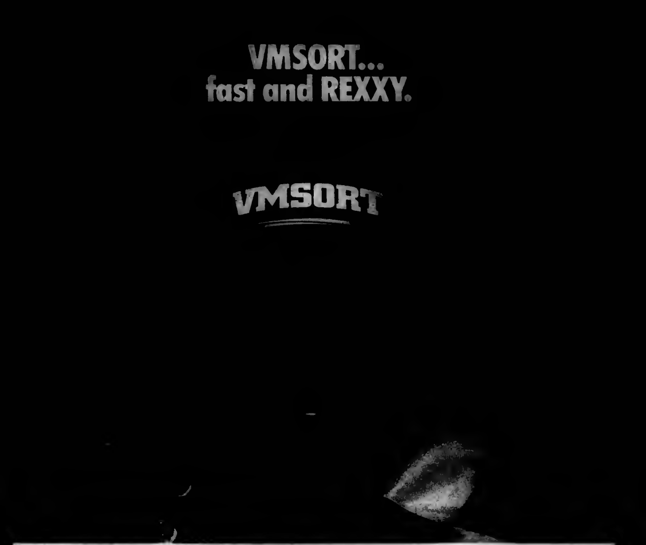

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Mass. agency shifts standard

From page 1

word processing task force that gave the nod to Word, said the transition period, while rocky, will have been worth the effort. Nevertheless, according to Dorr, "there is still lots of hostility."

Word was one of three personal computer word processing packages that BSPP reviewed. Other programs considered included Multimate Advantage, an upgrade from Multimate 3.3, which BSPP was using; and Wordperfect from Satellite Software International. The task force's goal was to select a word processing package that was document oriented, could run on a personal computer local-area network and produce high-quality output. The first standard was important, as the bulk of the bureau's work involves processing lengthy documents such as requests for proposals.

In mid-1985, the office decided to standardize on a networked, microcomputer-based system. BSPP was using a stand-alone word processing machine from CPT Corp. and six microcomputers (three Sperry Corp. Personal Computers, two IBM Personal Computers and one Eagle Computer, Inc. Personal Computer) that ran Multimate 3.3, said Harold Levinson, BSPP systems analyst and member of the word processing task force.

Because of the role BSPP plays in the Commonwealth of Massachusetts in shaping official computer practice, Corum felt his agency should project an image of high-tech sophistication. "It was ridiculous that we of all people weren't standardized," he said in a recent interview. During the past six months, the bureau got rid of the CPT machine and ordered 12 more personal computers — a mix of IBM and Ericsson Information Systems, Inc. models — as well as a Banyan Systems, Inc. file server. (The office had previously installed a Corvus Systems, Inc. Omninet local-area network but had not really used it, according to Levinson.)

Meanwhile, BSPP was also evaluating word processing packages, but this process proved to be more of a headache than the hardware and peripheral selections.

The bureau had an Oct. 1 deadline for a word processing software decision. In late September, the staff met to announce its selection, but "it didn't work out well," Dorr said. "Nobody agreed." The support staff, made up of five secretaries, "wanted to stay with Multimate. While they were set to stay with what they knew, there were others who were determined to change," Dorr said.

Since the deadline was closing in, the office agreed to form a task force, which met on Sept. 20. To save time, the eight-member group was split in three groups, and each was assigned one package to review. The support staff, which had been included on the task force and was pro-Multimate, was given Multimate Advantage to review. "That was my first mistake," Dorr said.

On Sept. 26, the task force reconvened. Wordperfect was eliminated, and both Word and Wordperfect won the same number of votes.

Even though Wordperfect would have been easier to learn than Word, it has certain features that do not suit BSPP, according to Dorr. While it does have automatic indexing and automatic renumbering of paragraphs, the task force also found that it was difficult to read and edit the codes in a document. For instance, a half line of text that is boldfaced, underlined, centered, marked for automatic paragraph numbers and for table of contents generation had five full lines of code preceding it. Since everyone from secretaries to senior analysts would be using the word processing software, this was a drawback. In addition, Dorr said, "We found that you couldn't vary the space between columns. That made it hard to do tables. And there's lots of statistical stuff here."

On Sept. 30, the task force met again. A 70-year-old support staff member switched her vote to Word, claiming that while she personally perferred Multimate, Word would be better for the office, Dorr said.

Multimate, Dorr said, would have been much easier for the office in the short run because a user "can be up and running in a day." With Word, however, "the learning curve is long and slow," she said.

However, Word is document oriented, a big plus to the bureau, whereas Multimate is page oriented. Dorr said it could take as long as 45 minutes to reformat a 35-page request for proposal with Multimate.

Furthermore, the Word package selected runs on a local-area network. When this decision was made in October, the task force was not aware of a Multimate package that ran on a local-area network, although Levinson said one had been announced.

The task force also had some complaints about Word. It does not have the convenient document summaries that Multimate has, and it does not indicate on what line of text the cursor is. "There's a trade-off to everything," Dorr said.

Training began the second week of November, and so far, "nothing has gone the way we wanted it," Dorr said.

First, an outside training session at a retail store in Boston, Businessland, was not successful. Although Dorr did not attend the second day of the two-day session, she said she suspects that it was "a little bit of the trainer getting bogged down and a little bit of resistance coming from our end."

Back at the office, a backlog started to develop, so some staff members started using Multimate again. Businessland agreed to offer another session free of charge, but it was never held because of scheduling difficulties.

Corum hired an outside consultant to come in for a one-month period and train staff members one on one. Dorr said the office is planning to go slowly with future training.

Agency evaluation

Word	
Document oriented	✓✓
Runs on a local-area network	✓✓
High-quality output	✓✓
Easy to learn	X

✓✓ Very good; ✓ Good; X Not satisfactory

Advantage	
Document oriented	X
Runs on a local-area network	*
High-quality output	✓
Easy to learn	✓✓

* Not available at time of initial evaluation.

Mass. Bureau of Systems Policy and Planning chose Word over Advantage.

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Computer industry arms for Senate battle over tax reform

By Mitch Betts

WASHINGTON, D.C. — The computer industry, seeking changes in the tax reform bill passed by the U.S. House of Representatives, will urge the Senate Finance Committee to restore permanently the 25% research and development tax credit and to reduce corporate tax rates to 35% or 33%, an industry lobbyist said.

Ted A. Heydinger, vice-president of the Computer and Business Equipment Manufacturers Association (CBEMA), said that CBEMA supported the House bill and helped to line up the votes needed to pass it — despite its reservations — to keep the tax reform effort moving forward.

Besides seeking a few changes in the House bill, Heydinger said, the computer industry will try to avoid losing any ground in the Senate. For example, he said, CBEMA will fight any proposals that tax R&D expenditures as income under the corporate minimum tax.

The House of Representatives passed the bill — which curbs or eliminates many business tax credits and deductions in return for lower corporate income tax rates — on Dec. 17 by voice vote.

The bill eliminates the 10% investment tax credit, retains five-year depreciation for computer equipment and allows a 20% R&D tax credit for three years while it reduces the top corporate tax rate from 46% to 36%.

The R&D credit expired Dec. 31 under existing law. Sen. John C. Danforth (R-Mo.) and others, backed by high-tech industries, tried to win a last-minute extension of the R&D credit through August 1986, but that effort was unsuccessful.

One provision of the tax reform bill, elimination of the 10% investment tax credit, will raise the cost of buying or leasing computer hardware, according to industry analysts [CW, June 3; Dec. 16].

Robert A. Bardagy, senior vice-president of Comdisco, Inc., a computer leasing firm based in Rosemont, Ill., said lease rates will go up 5% to 10% on Jan. 1 because leasing companies expect to lose the investment tax credit. "The increase will be significant but not devastating to the DP manager," he said.

VM software niche grows

From page 1

dition to VM versions of existing IBM software products.

This activity centers around a 16-year-old product that one user, Richard Rosenheim, software programmer for the New York brokerage of Scudder, Stevens & Clark, calls "the only operating system that can bend and accommodate the constant changes that we make in our processing environment."

The VM system appeals to on-line, interactive programs and can serve as a bridge while converting from one operating system, such as DOS, to another operating system, such as MVS, using the same machine.

The Scudder, Stevens & Clark experience with VM is typical of both what major users have confronted over the past few years and the reasons for the recent upsurge in activity among the independent software firms that accommodate these users — namely, the lack of a full range of utilities offerings from IBM. Scudder's IBM 4381 system runs IBM's VM/SP operating system and supports DOS/VSE to run its data base applications. According to programmer Rosenheim, Scudder recently added two specialized VM utilities obtained from an independent firm, VM Systems Software, Inc. of McLean, Va.

Scudder switched to VM four years ago, according to Rosenheim, a move made because the DP managers believed that the constant changes being made to data by brokers necessitated a flexible software system that would permit on-line updates and changes efficiently.

Damian Rinaldi, a software analyst at International Data Corp., a Framingham, Mass., market research firm, said independent VM companies supplying system utilities have been "growing very fast over the last few years, as opposed to other independents serving the DOS and MVS markets, who have been slow to jump on the bandwagon."

Rinaldi estimated that there are approximately 100 independent firms specializing in VM software products, of which two or three make up the largest share of the market, including VM Software, Inc. of Vienna, Va., and Computer Associates International, Inc. of Southbend, Ind. Rinaldi said that companies supplying VM system utilities generated approximately $935 million in 1985.

The independent VM software companies are in a precarious situation. They have helped spur demand for VM products but face the ever-present fear that increased demand will lead IBM to develop products that compete with their own as the market grows.

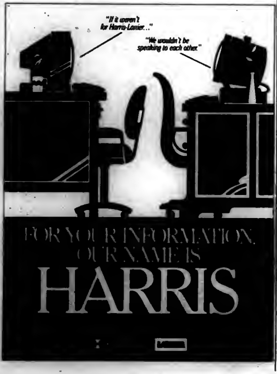
That fear is tempered by the conviction that any IBM involvement spurs demand even more. "We are content to let IBM take care of the center of the VM market while we concentrate on the edges," said Tom Foth, senior software specialist at Adesse Corp., a Ridgefield, Conn., specialist in VM education and software products. "We are going after the niches IBM doesn't appear interested in exploiting."

Foth claimed IBM is concentrating on expanding VM across all of its hardware systems, work that is absorbing much of its attention and leaves room for the independents to supply the utilities that users are demanding. In 1985, IBM expanded its VM lineup with an Extended Architecture version and CICS/CMS software products.

Third-party-supplied VM products provide needed functions, according to Michael Dewispleare, a system programmer at Shearson Lehman Brothers, Inc. in New York, another VM site.

"We are primarily an IBM MVS batch processing environment. But we run IBM's VM/CMS to support our information center. We use VM Center [sold by VM Software] to manage our information center, relying on it especially for our system security."

The increased interest and support now being given VM by IBM is ironic, said Gabe Goldberg, a programmer at VM Systems Software. "For years they ignored the thing as if they were hoping it would die," he said.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AT&T seeks approval to lower rates for international calls

Average 10% price cut expected in January

By Bryan Wilkins

WASHINGTON, D.C. — AT&T is seeking to lower international voice calling rates an average of 10.1% beginning Jan. 2. The reductions, which first must be approved by the Federal Communications Commission, would affect calling charges to 32 foreign countries and lower rates for callers by $150 million a year, AT&T said.

If approved, the planned reductions would represent the fourth time in four years that AT&T has lowered international rates in response to FCC directives that the international service be priced to recover its costs plus a 13.75% rate of return. Additionally, competition in the international voice market has picked up in recent years, with the entrance of MCI Communications Corp. into the marketplace through its purchase of Western Union International in 1983 and with the expansion of GTE Sprint Communications Corp. overseas. AT&T is still the dominant voice carrier in international calling services.

AT&T said the actual reductions for country-by-country calls will vary.

For example, calls to mainland Europe, including Austria, Belgium, Denmark, France, Italy, Spain, Sweden, Norway and Switzerland, would decrease by 10.7%, while calls to the UK and Ireland would decrease by 12.8%.

Calls to Australia, Japan, Singapore and Hong Kong would drop 6.8% and calls to the Middle East would drop 6.2%

Calling rates to Venezuela would decrease 13.9% and by 12.2% to India. Calls to Mexico would drop 5.2%.

AT&T said the planned reductions apply to initial-minute charges on direct-dial calls made from the U.S. as well as to additional-minute prices for direct-dial and operator-handled calls.

AT&T cut its international rates by 35% in in 1981, by another 6.1% in May 1984 and by 6.6% last June.

Frank Governali, an analyst with Kidder, Peabody & Co., said the planned price cuts would stimulate further demand for AT&T's international service and would not cause a drop in revenues.

No effect on earnings

Currently, "AT&T is probably earning in excess of a 16% rate of return on international calling, and this will have no effect on its earnings. In fact, they may increase as a result of this cut," Governali said.

Governali said that AT&T is currently grossing $1.5 billion annually on its international voice services and is able to be flexible in its pricing.

MCI said it was reviewing its own rates in light of the planned AT&T rate cuts.

TOP OF THE NEWS

NEWS from page 1

ers. This month Adobe is scheduled to release a set of 45 new printer fonts in 17 families used in professional typography.

■

Trilogy Ltd. recently reached a $7.1 million out-of-court settlement with investors who charged that the company's initial public offering was misleading. The offering was based on expectations that Trilogy, Gene Amdahl's second start-up venture, would develop a wafer-scale integrated circuit and would then use it to build a powerful IBM-compatible mainframe — both projects that were subsequently scrapped.

■

In a move that analysts say will strengthen the company's role in the on-line financial information market, Lotus Development Corp. announced Dec. 30 its plan to acquire Isys Corp., an Acton, Mass., software publisher. The acquisition would give Lotus rights to Isys products and technology, including the Analyzer and Microscan software packages. The IBM Personal Computer-compatible packages provide, respectively, financial analysis and data communications in connection with on-line financial data bases.

■

Former high-flying micro manufacturer Vector Graphic, Inc. late last month announced that it filed for protection from its creditors under Chapter 11 of the U.S. Bankruptcy Code. The company said it will pursue the previously announced merger with Dual Systems Control Corp., a deal which has not been finalized.

■

The New York investment house of Oppenheimer & Co. sees the potential for "a dramatic and sustained turnaround" in the computer industry, based on a survey of 97 mainframe and minicomputer salesmen. From April to November, the salesmen who said they believe the worst is now behind the industry tripled from 23.5% to 67%.

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Users debate life span of IBM's aging Personal Computer

Future of one-time standard uncertain

By Clinton Wilder

It came out of Boca Raton, Fla., in August 1981 to revolutionize an industry and mark a fundamental change in the corporation whose label it bears. But as the IBM Personal Computer approaches its fifth birthday this summer, there are strong indications that the product is nearing the end of its illustrious life as the first standard business microcomputer.

While compatible competitors like Leading Edge Products, Inc. and Tandy Corp. offer significantly cut-rate machines for the price conscious, and IBM provides quantum leaps in storage and speed with its own Personal Computer XT and AT, the glory days of the plain vanilla Personal Computer seem to be over. The IBM Personal Computer continues to sell, but the question remains just how much longer the market, and more important IBM, will continue to perceive the machine as a viable product for business applications.

Although large corporate micro users vary in their opinions on the Personal Computer's future, some said they feel strongly that it no longer makes sense for most office purposes. "The Personal Computer is a consumer item; we have standardized on XTs," said Warren Kress, manager of Volkswagen of America, Inc.'s information center in Warren, Mich.

Kress called Personal Computer memory boards and other add-on products "stopgap measures," saying the micro's basic limitation is the speed of the Intel Corp. 8088 microprocessor. "The chip doesn't have the processing power," he said. "The add-ons are like fighting old age."

Personal Computer all but abandoned

In the International Division of Electronic Data Systems Corp. (EDS) in Detroit, the basic Personal Computer has been all but abandoned in favor of several thousand Personal Computer XTs.

"The only person I can imagine buying the Personal Computer would be a very cost-conscious home buyer," said Bob Corr, office automation manager for EDS Pacific operations. "The XT is well worth the extra money for business. If you've already got a PC, okay, but I wouldn't buy a new one."

Corr said he feels the Personal Computer's biggest limitation is its five expansion slots compared with the eight slots in the XT. "When you've got a modem card, a micro-mainframe link and networking, they get filled up fast," he said. "I've run into that five-board slot problem too many times."

Not all users agree, however. At New York-based Touche Ross & Co., a handful of Personal Computer ATs handle the most demanding applications, but most of the desktop work is still done on some 2,000 stand-alone Personal Computers. "If we could get the AT for the PC price, fine, but obviously we can't," said Ronald Jenks, director of information services. "As long as they produce the PC, we'll continue to buy it."

Some users simply find that many applications are still right at home on the Personal Computer. Senior consultant Bob Wasserman of the Peat, Marwick, Mitchell & Co. accounting firm's Minneapolis office goes so far as to call it a special-purpose machine, with its specialty being smaller tasks.

"Not everything we do is huge," Wasserman said. "For most short reports and spreadsheet models, it's fine. I don't see IBM making any more of them, but there will always be a use for it."

Extending micros' lives

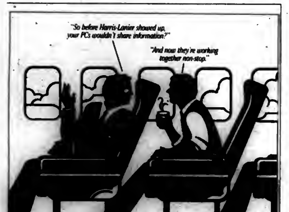
In some organizations, Personal Computers are getting their lives extended with additional memory and speed on expansion cards from start-up firms like AST Research, Inc., Plus Development Corp. and Mountain Computer, Inc.

Hartford, Conn.-based CM Alliance, parent company of the Connecticut Mutual Life Insurance Co., has purchased about 300 Plus Development Hardcards, which feature an XT-size 10M-byte memory on the plug-in board.

"That gives us a new lease on our PCs," said DP officer Chris Ludwig. "It buys us time until we make the next step, whether it's to a local-area network or something else."

That next step, from the MIS director's vantage point, represents perhaps the greatest threat to the Personal Computer's useful life. DP/MIS directors are still clamoring for the ability to network existing Personal Computers to solve their office automation needs. The efforts of network

See IBM page 10


"So before Harris-Lanier showed up, your PCs wouldn't share information?"
"And now they're working together non-stop."
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Scanner puts text on-line

From page 1

will convert images to data and then reformat it into electronic data base form, said Lee Cannon, vice-president of marketing. Several new programs are in the works for 1986, he added.

The product is based on Dest's $10,000 to $12,000 Workless Station, a desktop optical character reader for dedicated word processing systems, but it is more flexible and costs less, Cannon said. The PC Scan optical reader is priced at $1,995, and the Text Pac software costs $595. The system also needs a controller card that will enable the scanner to communicate through the standard small computer system interface, which Dest sells for $195.

Dest's approach of bit-mapped conversion gives users one platform that allows the system to recognize anything they feed into it, said Michael Goulde, market analyst with the Yankee Group in Boston. "Once they've read the text, they can load it into any application," with applications limited only by the creativity of software developers, he said.

"The technology is not revolutionary by itself, but they've brought it in at maybe one-third the cost of any competing product," Goulde said. He predicted healthy sales for PC Scan and suggested that the product's low price will help accelerate development of applications for desktop scanners.

"Personal computers represent a big untapped opportunity," Cannon said. Dest's research showed that the word processing market is the largest potential user of optical scanning systems, so its first software for the personal computer version is designed to convert typewritten information to electronic data.

The scanner itself can read a printed page in five seconds, but Text Pac takes 25 seconds to convert the page into characters reproduced on the monitor in the proper format for the word processing program in use, Cannon said.

Text Pac also inserts appropriate formatting commands, including tabs, paragraphs, line lengths and page breaks. According to Cannon, its operation is essentially invisible to the user, who must only specify when asked which word processing package is in use for appropriate formatting.

The software recognizes formats of Multimate from Multimate International Corp., which is now a subsidiary of Ashton-Tate; Wordstar and Wordstar 2000 from Micropro International Corp.; IBM's Displaywrite II and III; Samna Word III from Samna Corp.; Wordperfect from Satellite Software International; and Microsoft Corp.'s Word.

The scanner hardware measures 11¼ inches wide by 16 inches long by 4 inches deep and weighs 17 pounds. It accepts 16- to 30-pound weight paper up to legal size and adjusts exposure automatically for colored paper.

"There are still 21 million pages of paper created in U.S. businesses every day," Cannon said, citing an Arthur Andersen & Co. study. While storing documents on disks saves space, and electronic data bases are often ideal storage-and-retrieval systems, the trick is getting the accumulated information from the standard file cabinet into the electronic one, he pointed out.

Dest estimates a $30 million market for personal computer optical scanners in 1986, which could grow to some $200 million in 1990. Offices would use personal computers for more filing resources were it not for the massive job of rekeying years of archived paper documents, Cannon said.

Besides offering quick translation of archived paper records, PC Scan enables users to transfer data between incompatible machines, Cannon said. He envisions heavy potential use in offices, such as legal offices, that create many repetitive documents.

PC Scan will be available this month to Dest's 130 dealers across the nation, as well as to some value-added reseller channels for such vertical markets as government, law and education. OEM agreements are still in negotiation, he said. Dest has already produced an OEM image processing model, Cobra, for Wang Laboratories, Inc.

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OTA pushes for government research on VDTs and health

By Mitch Betts

WASHINGTON, D.C. — The U.S. government needs to conduct more research about the health problems of VDT users, but most of the transition problems associated with office automation do not require immediate government action, according to the U.S. Congress' Office of Technology Assessment (OTA).

In addition to health concerns, the government should pay particular attention to changes that office automation makes in U.S. employment patterns, a new report by the nonpartisan office said. But the OTA report concluded that the scrutiny should not obscure the benefits of office automation.

"If judiciously implemented and wisely managed with a view to the legitimate interests of all parties, this basic technological advance can strengthen the American economy and advance the well-being of all Americans," the report said.

As commonplace as phones

The OTA said that in the office of 1990, one out of every three workers will use a computer terminal, and by the year 2000, terminals may be as commonplace on office desks as telephones are today.

The major health issues in office automation are the long-term stress of office jobs and the effect of VDT work on pregnant women, the OTA said, adding that the government lacks critically needed data on these subjects.

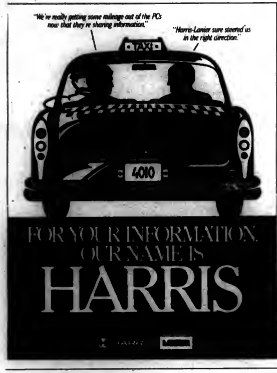
Consequently, the OTA suggested, Congress should direct the U.S. Occupational Safety and Health Administration and the National Institute of Occupational Safety and Health to conduct more research concerning the health of office workers. The agencies now mainly emphasize the health of blue-collar workers.

While available scientific research leads to the conclusion that VDTs do not hurt human reproduction, the OTA said, reports of unexplained miscarriages among VDT users and heightened public concern "make it essential that scientific research and careful monitoring continue until the possibility is entirely ruled out."

The increased efficiency offered by office automation is likely to slow the growth in office employment in the next few years, and during the 1990s, office employment may begin to decline, the OTA reported. Data entry jobs, especially, could be sharply reduced by the use of electronic document and funds transmissions, optical scanning equipment and voice recognition systems.

The OTA concluded that the possibility of reduced job opportunities in office work, which provides jobs for nearly half of U.S. workers and has been the strongest source of job creation throughout this century, is something Congress should watch closely.

The report, titled "Automation of America's Offices," is available from the U.S. Government Printing Office in Washington, D.C.


"We're really getting some mileage out of the PCs now that they're sharing information."
"Harris-Lanier sure steered us in the right direction."
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IBM micro's life span debated

From page 8

vendors to tie together micros into corporate office systems may be too little too late for the older model.

"It's a race now — departmental processors are getting better while PCs, through networking, are growing up," Volkswagen's Kress said. "The question is, Will PCs grow fast enough and to such an extent to replace departmental processors?"

Many in the analyst community predict that the Personal Computer may soon go the way of the punch card. "I would be very surprised if the original IBM PC lasts through 1986," said Frank Gens, IBM analyst for International Data Corp. in Framingham, Mass. Gens said he believes IBM must offer a model running the Intel Corp. 80286 microprocessor in the $1,500 to $3,000 price range and envisions a stripped-down Personal Computer AT replacing the basic Personal Computer in 1986.

Only about 20% of IBM's retail microcomputer unit sales in 1985 have been Personal Computers, compared with 80% two years ago, according to San Jose, Calif.-based Dataquest, Inc. By contrast, the Personal Computer XT, in both floppy- and hard-disk-based versions, accounted for 50% of IBM retail unit sales this year, compared with 20% in 1983.

But some observers insisted that reports of the death of the Personal Computer are premature. "IBM has never dropped a product that still generates revenue for them," said Michael Gould of the Boston-based Yankee Group.

IBM, however, seems to be resisting any pressure to engage in a price war. Compatible vendors have already slashed prices below $2,000, creating expectations that similar machines will be available for the price of a IBM Selectric typewriter.

If IBM will not cut the price, it seems faced with an inevitable decline in demand for its entry-level machine. "Spending only $250 more for the floppy XT rather than the PC has to be a better business decision," said Norm DeWitt, director of Dataquest's micro service. "Personal Computer prices should come down in early 1986, but nothing lasts forever. Sooner or later it will be discontinued. Other vendors have had four years to copy and improve upon it, and many have done that."

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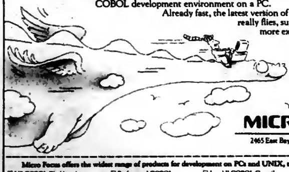

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Dr. E. F. Codd, Computerworld, 10/21/85

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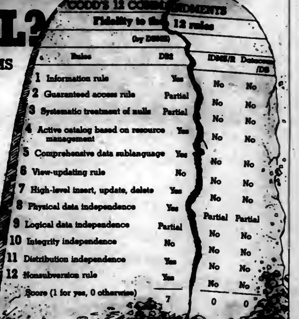
Dr. E. F. Codd on ORACLE in his paper, “Is Your Relational Database Management System Really Relational? An Evaluation Scheme,” 9/10/85.



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(by DBMS)

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2 Guaranteed access rule	Partial	No	No
3 Systematic treatment of nulls	Partial	No	No
4 Active catalog based on resource management	Yes	No	No
5 Comprehensive data sublanguage	Yes	No	No
6 View-updating rule	No	No	No
7 High-level insert, update, delete	Yes	No	No
8 Physical data independence	Yes	No	No
9 Logical data independence	Partial	Partial	Partial
10 Integrity independence	No	No	No
11 Distribution independence	Yes	No	No
12 Nonsubversion rule	Yes	No	No
Score (1 for yes, 0 otherwise)	7	0	0

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RDS announces SQL-based fourth-generation language

Targets applications development on Unix

By Eric Bender

MENLO PARK, Calif. — Rounding out its family of IBM SQL-based development software for AT&T Unix systems, Relational Database Systems, Inc. (RDS) next month will take the wraps off a fourth-generation language product.

RDS' Informix-4GL, scheduled to ship Feb. 15, was designed as a complete application development system that also can supplement the company's Informix-SQL data base management system, said Vice-President Laura King.

Traditionally, programmers trying to finish off a custom application "tend to run out of power with the data base management system," King said. At that point, they either go back to the user with their regrets or go on with time-consuming development in languages such as C or Cobol, she added.

Using nonprocedural syntax

Informix-4GL speeds up this process, permitting programmers to specify the application primarily using nonprocedural syntax, King said. The company claimed that applications requiring hundreds of pages of C or Cobol code can be written in a few pages of Informix-4GL.

Noting that there are various definitions of fourth-generation language, King said that "ours is a language that an application builder will use."

She described Informix-4GL as a full-function system development language, which offers a fair amount of overlap with RDS' SQL product. "You get more help initially with Informix-SQL; you might use it for a prototype," King said. Informix-4GL users "have to be willing to write using a more sophisticated language," she added. Informix-4GL handles report writing and SQL queries, along with the ability to create custom Lotus Development Corp. 1-2-3-like ring menus, context-sensitive Help and customized data entry and query screens with scrolling and procedural controls, according to King.

Informix-4GL also can interface to existing C routines either as a linkable library or through the companion Informix-ESQL/C product, the company said. Data bases are fully compatible with Informix-ESQL/Cobol.

Pricing will range from $1,500 on the IBM Personal Computer AT under Microsoft Corp.'s Xenix to $36,000 on the Digital Equipment Corp. VAX 8600 under DEC's Ultrix. Other versions in the initial release include Altos Computer Systems, Inc. 2086, $2,400; AT&T 3B2, $2,400; AT&T 3B5, $4,500; AT&T 3B20, $18,000; AT&T Unix PC, $1,500; DEC Microvax II, $4,500; DEC VAX-11/750, $9,000; DEC VAX-11/785, $18,000.

'The market has really expanded'

RDS has sold 25,000 Unix licenses, and the 6-year-old firm's products "cover the whole spectrum of Unix machines — almost 90 systems," King said. She noted that although commercial Unix software initially targeted supermicrocomputers almost exclusively, "the market has really expanded, most importantly to larger machines."

The firm also will offer a $995 version for the IBM Personal Computer and compatible systems, available in March, King said. Additionally, a version for the IBM PC Network will follow, with pricing not yet set.

RDS began to offer IBM PC-DOS products three years ago and now has 5,000 sites installed — "a pretty respectable number for a company like this," King commented.

Paradyne cut from federal work

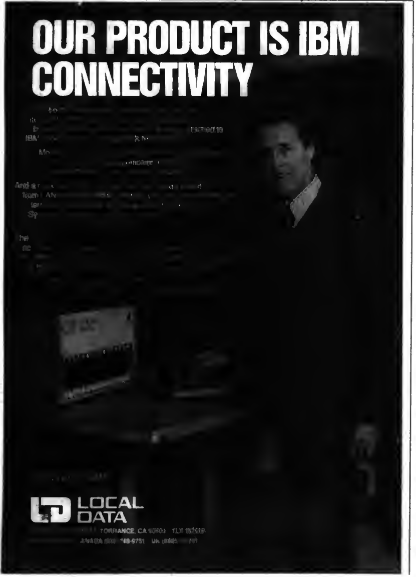
By Bryan Wilkins

WASHINGTON, D.C. — Paradyne Corp., the Key Largo, Fla., data communications firm, was suspended last week from doing work for the federal government. The action followed a recent 14-count indictment by a federal grand jury against the company and some of its officers in connection with a $115 million contract in 1981 to supply the Social Security Administration (SSA) with data terminals.

The suspension does not affect the one-year, $12.4 million renewal of Paradyne's contract to support the terminals that have already been installed at the SSA.

Paradyne denied any wrongdoing and asserted that the terminals have met SSA requirements. Meanwhile, the SSA is finalizing its analysis of bids to install new office automation and communications systems at its regional and central offices.

The 14-count indictment brought against Paradyne and seven current and former company officials alleged conspiracy to bribe and defraud the U.S. government in regard to the contract. Additionally, Paradyne Chairman Robert S. Wiggins was charged with obstruction of justice during an SSA investigation of the contract.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VIEWPOINT

EDITORIAL

A year of living dangerously

If one theme sounds throughout this special forecast issue, it is this: Data processing executives have never faced greater personal and professional challenges than they will in the year 1986. Success will require seizing initiative and taking risks to an unprecedented degree.

During the first half of the decade, there was ample reason for caution. Vendors promised far more than they delivered, and the wary data processing manager could justify moving slowly and cautiously in terms of both purchase and implementation.

That strategy will be increasingly difficult to defend as corporate executives demand the data processing "magic" that provides more and better information as well as greater productivity and as users demand more sophisticated tools. Data processing managers will be forced to acknowledge the problems with highly touted but not fully evolved technologies and make the best choices they can.

True, all vendors have not yet delivered on every promise, but enough have delivered on some of those promises to put the proverbial ball in the DP manager's court. An array of new products and services promises to lower voice/data communications costs significantly while increasing a company's competitive advantage.

Major applications vendors have introduced long-awaited schemes to integrate diverse software packages. Major mainframe and superminicomputer manufacturers began delivering their next-generation machines in late 1985; the remainder will appear this year.

Microcomputer technology has matured substantially, moving many of these machines from the category of personal productivity tools to that of intelligent workstations and powerful nodes on local-area networks.

True, too, many of data processing's problems apparently have not been amenable to clear-cut technical solutions. Programmer productivity is one. Microcomputer-based workstations offer some hope, but they do not represent the technological miracle that will improve productivity by the 100-plus percent necessary to clear the applications backlog and to get software development rolling into the next century.

In fact, the data processing community has for too long awaited complete technological solutions when the very evolutionary nature of technology makes that impossible. There will always be new technical problems and vendor promises of solutions.

That is not to denigrate the significance of either the problems or the solutions. It is simply to recognize the reality of the more formidable challenge now facing data processing managers.

That challenge consists of laying aside the strategy of waiting for vendors to provide complete solutions. Instead, DP professionals must take the risks required to grapple with a panoply of partial solutions — technical and human — and wrest out of them a course of action and implementation that serves the unique needs of individual organizations.

That is the inevitable scenario and one that presents perhaps the greatest challenge the data processing community will face in the 1980s.

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LETTERS TO THE EDITOR

Information officers may not want, need most advanced technology

The article "Planning amid change" [CW, Dec. 9] illustrates beyond a shadow of a doubt why most data processing executives should not be considered as candidates for the position of information executive or chief information officer.

My definition of an information executive vs. a data processing executive is based on the broader role the information executive plays in the corporation. The information executive's job is primarily created by the competitive demands for the total business enterprise and by a recognition of the need for information to be handled in a strategic manner and, certainly, on a corporate basis.

Conversely, today's data processing executive as described in the article is more concerned about allowing "MIS to reap the benefits of ever-changing information technology in an environment where fundamental assumptions become obsolete monthly." Translation: Vendor hype is more important than the realities of running the business?

The differences described above are those of scope and scale. They are significant because an information executive may not actually require advanced information technology to meet the competitive demands of the enterprise. All the executive requires is a willingness to ask who requires what information as well as when and where — independent of vendor hype.

George Dance
Pittsburgh

RJE can transmit data securely if caution and preparation are used

A recent letter to the editor, "Easy RJE data transfer overshadowed by method's vulnerability to hackers" [CW, Dec. 2], overstated the security risks of using remote job entry (RJE) for transmitting corporate data. With caution and preparation, RJE may safely be used for data transmission.

The following are specific examples:

- Mainframe RJE protocols allow passwords to be required before any data will be transmitted or received.
- Mainframe RJE protocols require a remote user to be authorized to issue operator commands affecting more than the operator's specific link.
- Many RJE links are connected over leased phone lines, making it impossible for a casual user to stumble onto the link's phone number, to sign on and explore.
- RJE does not bypass normal security facilities — it does not allow "a sophisticated user . . . to corrupt the corporate data base" if the user could not already do that by other means.

An installation oblivious to security might fail to exploit any of these techniques, but the resulting exposure would be because of negligence rather than because of faults in the RJE architecture.

Gabe Goldberg
Consulting systems programmer
VM Systems Group
Arlington, Va.

DPMA places VDT safety responsibility on users and vendors, not lawmakers

The Data Processing Management Association (DPMA) recently adopted a position statement concerning proposed regulations on VDT use. In the article "DPMA opposes VDT restrictions" [CW, Dec. 16], the DPMA's position was accurately summarized: "Legislation restricting the use of VDTs or limiting exposure to them is premature and counterproductive."

Unfortunately, "Notes & observations" in the Viewpoint section [CW, Dec. 16] left out an important part of the DPMA position statement.

The text of the position statement includes, "The DPMA encourages both users and vendors of VDTs to cooperate in the proper installation and utilization of VDTs at each site, employers to educate and train their employees in the proper use of VDTs, manufacturers to design properly and employers to provide workstations with flexibility in order to accommodate a wide variety of users."

Almost on a daily basis, our profession must face and cope with the challenges of technological change and its effect upon business, industry, computer systems and — most important — upon people. We will continue to keep an open and sensitive mind to this ergonomic concern. And we will continue to insist that our actions be evaluated and reported upon in a similar manner.

Eddie M. Ashmore
International president
DPMA
Park Ridge, Ill.

VIEWPOINT

One-person support centers limit MIS links to users

By Naomi Karten

How can it be that so many information centers and microcomputer support centers are each staffed by only one person?

In most companies, information centers are up to their keyboards in work, developing user proficiency in personal computing while attempting to integrate this dynamic new technology into the overall computer and business environment.

READER'S PLATFORM

Planning — remember planning? — falls by the wayside; there simply isn't time to worry about tomorrow, next month or next year when your users are playing tug-of-war for your attention.

One such personal computer specialist explained how he decided which users to help. "That's easy," he said, "whoever gets to me first. But I have to hide if I want to take a break," he added. "And I've learned never to go anywhere without my screwdriver because I can't get from my desk to the cafeteria without being sidetracked by five users with problems they need fixed right away. Half the time, I never even get to lunch."

And what happens in a one-person information center when this person is away, attending a conference, on vacation or even — perish the thought — sick? Easy. With no backup, user support comes to a standstill.

Users have nowhere to turn for help, and any productivity gains they have made take a rapid plunge. There are numerous strategies that create a more equal division of labor between users and the information centers and avoid nonstop cries for help.

But putting these strategies to work takes a critical mass — for example, a staff size of at least two — so that one can establish guidelines and standards, run interference with users and monitor progress, while the other provides the day-to-day, minute-to-minute support.

User support people tend to be a very service-oriented bunch. As inundated with work as these one-person jack-of-all-personal-computing-trades are, most enjoy their jobs immensely. They genuinely like working with people and derive a lot of satisfaction from helping nontechnical users become proficient with computers.

But how long can they keep it up? At what point will they burn out or just get tired of the user support treadmill? As one person said, "I put in 12 hours a day, and I love it. But my users are becoming angry. There's no way I can keep up with all of them. It's beginning to get to me."

Information center pundits sometimes spout ratios, such as one support person per 30 users or one per 100 users or one per 1,000 users. This one-ratio-for-all approach is a bit simplistic, given the myriad of factors unique to any particular organization. But no algorithm, even adjusted for all possible variables, would produce a ratio at the level faced by the one-person information center.

And where is MIS senior management during all this? That, really, is the important question. One information center worker voiced the concerns of many of her peers when she stated, "My management just doesn't understand what's involved. I don't know how to get through to them that I need more help."

My computer-based speculation processor has generated some theories to explain management's apparent lack of concern. For example, could it be that management views end-user computing strictly as a stopgap to divert user attention while MIS makes a bit more progress with its really big systems?

One implication of such a theory is that management views its information center staff as dispensable and that if the entire user support endeavor fails not much has been lost. A self-fulfilling prophecy, if there ever was one.

A second theory is that management really doesn't understand. In the eyes of many managers, since personal computers are small, managing their use must be easy and coordinating their integration into the business environment must be easy. Anything viewed as that simple certainly wouldn't justify an investment of more than one person. It follows logically that if the user support person can't keep up with the work load, the problem must be the person, not the responsibility.

A third theory is that MIS management simply isn't aware of what's happening on the end-user computing side of things. It's a different world, after all. It's as different as can be from the third-generation Cobol-oriented system development orientation in which most MIS managers spent their favorite years.

In some companies, users have begun to give up on their information centers, viewing them as more of the same from MIS: long on promise, short on delivery.

MIS management must come around to realizing that end-user computing is not a transient phenomenon. Like it or not, it represents today, tomorrow and probably the great forever after.

Sooner or later, MIS managers must realize that they cannot complain about losing control over corporate computing and, at the same time, refuse to allocate sufficient resources to retain that control.

MIS management must realize that information as a stratgic tool means something more than fixing broken printers so users can complete their status reports on time.

Karten, president of Karten Associates in Randolph, Mass., consults and lectures nationally on strategies for success in the management of corporate end-user computing.

Welcoming 1986 as the year of the user

By Charles P. Lecht

According to the Chinese, 1986 is the year of the tiger and 1985 was the year of the ox. Whether or not the Oriental sages who conjured these images meant them to be comparative symbols of computer industry events in these two years, they offer a perfect correlation.

Could anyone dispute that the year 1985 was anything more than ox-like, plodding in the computer industry?

The foreign trade issue so consumed our attention that many failed to notice that domestic trade was less than vigorous for any new company attempting to gain turf in our emerging information systems field. As if behind plows pulled by oxen of gargantuan power, the companies that ruled the field at the beginning of the year, IBM and AT&T, spent the remainder of 1985 plowing the fertile marketplace to sow whatever new business seeds they carried in their sack loaded with things to grow.

LECHT ON SCIENCE

> ”
>
> ***This year of the tiger may also come to be known as the year of the user. With increasing standardization, planning will once again be possible.***

As any farmer will tell you, the process of plowing includes the turning of old plants and new saplings alike; that is, if they get by the mouth of the oxen.

This is not to say that our industry leaders had not earned the right to plow our field. They confirmed their right to rule our computer and communications fields after withstanding years of assault by the courts and competition alike.

Battered by the storm of change that engulfed them in the first half of the 1980s, our smaller manufacturers stubbornly plodded through 1985 trying like the devil to remain alive by following the troughs and furrows of our industry leaders while obtaining licenses to sharecrop.

Turned into domestic serfs

Some didn't make it. Many who did were forced into a harness of foreign origin or were turned into domestic serfs. Some with the resolve to make it in other ways sought relief from their woes by hauling alien industries into court.

Others were hauled into court themselves to pay their dues for rugged individualism. This was a time when a conservative and conformist posture would have suited them more.

It's my guess that 1986 will provide us with a dramatically different information systems industry picture.

When the going gets tough, the tough get going, and one can only agree. And what's tougher than a hungry tiger? A pack of them.

As 1986 opens, the field is surrounded by a mess of ornery and hungry tigers — the hundreds of companies that took to the hills to await a better day. The year 1986 is its dawn. Why?

Stimulate the pack to seek adventure

For one thing in 1986, the scent of the de facto information systems industry standard set by IBM and AT&T cannot help but stimulate the pack to seek adventure beyond the reaches of their current lairs.

Lack of an industry standard was the single most important obstacle to their doing so because its absence constituted a ravine into which most were to fall. Users, too, should benefit; now removed is a veil that until this day had served to obscure their future purchasing choices.

The new entrants to our information systems industry, those whose capabilities extend beyond the mere manufacturing of hardware and software, will find it far easier to compete in 1986. Service companies capable of offering experience in all sectors such as retailing, advertising, financial management, inventory control — the list is virtually endless — but have thus far been blocked from doing so by the technological and financial demands of trying will see that roadblock removed in 1986.

No longer is there a real need for them to be concerned with the means of getting there; now it's what to do after arrival.

This year of the tiger may also come to be known as the year of the user. With increasing standardization and many more supplier options, planning will once again be possible.

Theaters of the absurd

In comparison, the technological environments within which users had to perform their information processing chores for the first half of this decade will, by its end, appear as theaters of the absurd.

The hoots and hoopla of making a system work will be replaced by the challenge of what to do with its output. The madness of users group therapy sessions to coerce a reluctant supplier will be replaced by business group creative meetings to address what can be done with current systems.

The year of the ox is ended. Let us welcome the tiger.

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies. He divides his time between Tokyo and New York.

TURNAROUND TIME

Larry Long

Q *Two weeks ago, management pulled two of us and another programmer/analyst away from our routine duties and assigned us 100% to an emergency, high-visibility development project. Our manager essentially told us not to bother him until the project is completed. Two of us view this project as a career opportunity to show what we can do. The third member of our committee views it as an opportunity to do some unsupervised loafing.*

We are all of equal rank, and no one was appointed as project leader. We were given the impression by our manager that we will be evaluated equally on the overall project effort. We are on schedule and making excellent progress toward meeting the deadline, which is three weeks from now, but only because two of us are spending nights and weekends on the project. The long hours will continue unless we can convince our third member to pull his load. Our question is, Should we report his inactivity to our boss?

It is not your function to evaluate your peers. I would suggest that the committee request a weekly progress meeting with your manager to tap his wisdom and to invite his feedback on how the project is going. On an emergency high-visibility project this should be done as a matter of course, anyway. For each meeting, prepare a brief written progress report and a summary of individual activities. If your manager doesn't already know what is happening — and I'll bet he does — then he surely will by the time the project is completed.

Q *I was not affected by a recent work force reduction, but the writing is on the wall. I will surely be cut in the next one. In preparation for the inevitable, I have begun my search for another position. I have responded to all advertisements in the local newspapers and have sent my resume to virtually all reasonably sized companies within commuting distance of my home.*

To date, I have not received one invitation for an interview. My resume is enclosed. I would appreciate any comments on why my search for employment has reached a dead end.

You made a classic error in the preparation of your resume. Your resume reads more like the history of automation. The reader must journey through 2¼ pages and several generations of computers and software before reading about what you can do for him today. At the first level of screening, resumes are often scanned. Someone scanning your resume might get the impression that you are one of the dinosaurs.

Many people screening resumes are too young to appreciate Autocoder programs or the IBM 1401, but they do understand the word "programmer." Certainly you should list all previous positions held and provide a brief discussion of duties, but any in-depth discussions should focus on state-of-the-art skills. You have some marketable skills. Prepare a resume that draws the reader's attention to these skills.

Q *For the past seven years, I have been involved in all aspects of the printing business. My undergraduate degree was in the social sciences, so almost all my DP training has been on the job. For the past three years I have been a DP manager for a $20 million magazine printer, and I manage a staff of two.*

To be more effective in my current job and to be more attractive to future employers, I feel that I need some formal training in all aspects of MIS management. How can I improve my knowledge to be effective in my current job and to increase my future marketability?

Most MIS degree programs, at both the undergraduate and graduate levels, focus attention primarily on the use and application of hardware and software technology. But the principles of MIS management are difficult to teach and learn outside the context of a particular set of circumstances.

As a result, academic institutions sometimes slight such topics as planning, procedures, in-house education, personnel management and the implementation of productivity measures.

Effective MIS managers are seldom products of formal education programs. Certainly MIS managers wishing to improve their ability to manage take advantage of available educational videos, seminars, books and periodicals. These resources provide them with a foundation of understanding for specific facets of MIS management. The real learning comes when they attempt to apply this knowledge to their environments.

When confronted with a particular management problem — information systems planning, for example — the really good managers tend to immerse themselves in all available information on the topic. Then they make a concerted effort to apply what they have learned. In short, the overwhelming majority of practicing MIS managers improve their skills through self-study and good old on-the-job training.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd would like him to address, send it to Larry Long, Editorial Department, Computerworld, *P.O. Box 880, Framingham, Mass. 01701.*

NEWS

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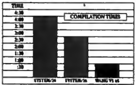

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FORECAST

Mainframe strategies

Building on the foundations of 1985

By James Connolly

Just six months into 1985, the product whose code name had been bandied about for many months — Sierra — broke into the open, and IBM's 3090 was presented to the public.

The Feb. 12 introduction was more than a high-end processor announcement. It was the impetus behind a wave of offerings on which a half dozen mainframe vendors will build their marketing and product development strategies for several more years. Last year was one of transition, if not booming profits, as mainframe vendors moved into a new product cycle.

In contrast, this year is likely to be a year of market solidification and, in some cases, holding on by the corporate fingertips. There will be some new processors announced, some previously announced products delivered and some existing products enhanced this year. But most mainframe vendors launched their flagship processors last year, leaving them with the jobs of tuning, producing and marketing those products this year and in 1987.

Within a month of IBM's announcement of the two versions of its 3090 — the dual-processor Model 200 and the quadratic processor Model 400 — plug-compatible competitor National Advanced Systems Corp. answered by rolling out its AS/XL systems. Another plug-compatible manufacturer (PCM), Amdahl Corp., waited until October to answer the 3090 but responded with three models of its new high-end mainframe, the 5890. While IBM began delivering its Model 200 two months early, around Labor Day, the Model 400 and the PCMs' offerings will not show up at customer sites for several more months.

Scattered throughout the IBM and PCM announcements, some of the non-IBM-compatible vendors commonly known as the BUNCH — an acronym for Burroughs Corp., Univac (Sperry Corp.), NCR Corp., Control Data Corp. and Honeywell, Inc. — unveiled their own high-end systems.

Burroughs announced its high-end A15 and mid-range A10 systems. Honeywell offered five models of its DPS 90 series, and Sperry enhanced its 1100/90 processors. NCR did not jump into the high-end race and stayed with its V-8695 system with a performance rating of 7.3 million instructions per second (MIPS), a rating well below the 27 to 75 MIPS range where other mainframe vendors are doing battle.

This year is likely to be a year of market solidification and, in some cases, holding on by the corporate fingertips.

Financially troubled CDC also stood pat in terms of its top-of-the-line hardware, with its Cyber/180 series, introduced in 1984, but did begin deliveries of the high-end member of that series, the Cyber/180 990 with performance claims as high as 65 MIPS.

But that was last year.

The two primary questions facing all the mainframe vendors this year are how to expand, or at least maintain, market share with their announced products and how to stay in a market where they are expected to develop a new high-end generation every three years.

"The question continues to be whether these companies will continue to put in the big

ILLUSTRATION BY DAVE RIDLEY

bucks for developing their own large systems, at least as far as the BUNCH is concerned," observed technology analyst Steven Milunovich of First Boston Co.

He noted that while companies such as IBM, the PCMs and Burroughs are moving from new product introduction cycles into production and growth cycles, they still must deal with a market slowed by "saturation of computing power" and "a weakness in capital spending plans" on the part of customers.

Independent consultant Dale Kutnick of Wayland, Mass., added that for most mainframe vendors, mere survival in the market will be the challenge. "The cost of producing a mainframe is skyrocketing. If you are one of these companies, you have to hold on. The rest of this decade is going to be a matter of holding on," he said. Kutnick said the BUNCH companies "just don't have the money to make inroads into IBM's customer base" by continuing to develop and market their own high-end machines.

> ***'The BUNCH companies just don't have the money to make inroads into IBM's customer base. The bottom line is that this is an IBM world. IBM is the de facto standard.'***
>
> — Dale Kutnick
> Independent consultant

He cited the example of Honeywell, which has turned to NEC Corp. of Japan to produce mainframes. Among the PCMs, Amdahl developed the 5890 basically on its own, but with some joint research with Fujitsu Ltd., which is a 40% owner in Amdahl. NAS does not produce its own mainframes but serves as U.S. marketing representative for Hitachi Ltd.

There has been little sign of the BUNCH companies or the PCMs chipping away at IBM's base. Although market researchers may not agree on the precise numbers, one illustration of IBM's dominance is market research firm International Data Corp.'s (IDC) estimate that for 1984, IBM shipped 67.4% of the large-scale computers installed worldwide. Burroughs held second place in that survey with 9% of the market.

"The bottom line is that this is an IBM world. IBM is the de facto standard," Kutnick observed, although he noted that the BUNCH companies, operating in various market niches, have their customers locked into their own technologies. He added that the benefits of jumping to the IBM world often are outweighed by the cost of scrapping BUNCH peripherals and software. The time and money involved in installing a $5 million mainframe and the accompanying peripherals and software are too great to allow frequent box swapping in many DP shops.

With the 3090 technology in place, IBM is likely to increase production of those 3090s and a key peripheral — the 3380 disk drive — this year.

Late last year, demand for the high-end 3380 Model E dual-density drive was slow enough to spur an IBM price cut, but the demand for the 3090 Model 200 was hot enough to keep a steady order backlog. Many of those Model 200 buyers are already talking about upgrades to the Model 400.

It also is conceded by those observers that a uniprocessor version of the 3090, commonly referred to as the Model 100, will debut early this year.

Other IBM announcements to watch for this year include new models in the mid-range 4361 and 4381 lines. However, observers noted that this year may be the last full year for 4300 sales, with a replacement line expected to be announced in 1987 for 1988 delivery. In addition, IBM is expected to introduce a high-end member of the System/36 minicomputer line and its long-awaited reduced instruction set computer (RISC) engineering workstation.

But IDC analyst Frank Gens said that IBM's strategy involves more

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than adding high-end processors every three years and mid-range systems in the interim. That strategy is based on the need to tie distributed systems into the mainframe and to let the sale of distributed systems spur mainframe sales and mainframe sales to drive more distributed system sales.

"Stage one was to get the distributed hardware out there, to install something, whether it was personal computers or the IBM System/36. Now they are coming into stage two, which will be where they tie that hardware into the mainframe. That will be a build cycle, where the more distributed systems you sell, the more large systems you sell. You start hitching mainframe growth to distributed systems growth," Gens said.

Crucial combination

That combination, particularly the mainframe hardware and software aspect, is crucial to IBM, according to Gens. He noted that the profit margins are significantly higher on those mainframe sales than on personal computers and low-end systems. Among the tools needed to carry out that distributed approach, according to several observers, are a new version of the MVS/XA, which is due in 1987 or 1988, and a new version of DB2, IBM's relational data base management system.

MITCHELL J. HAYES

The rest of the industry continued to trail behind IBM in 1984.

Gens said new versions of MVS/XA and DB2 are necessary to support the additional user demand involved in a shift to more distributed systems.

Gens and Kutnick noted that the new MVS/XA will be different from the current version but will not represent as dramatic a step as did the transition from MVS/SP to MVS/XA. They said that a drastic shift would make it harder for the PCMs to compete, but it would also complicate the lives of IBM's own customers, many of whom are still putting off the conversion from MVS/SP to XA.

While developing those products, and a six- or eight-processor 3090 set for 1987 introduction, IBM researchers reportedly have set their sights on a new generation of mainframes. That project, code-named "Summit," is expected to lead to a product announcement in 1988 or 1989.

What will Summit look like, and will it be the end of IBM's 370 architecture?

Milunovich predicts that Summit will incorporate the 370 architecture, but added, "They just moved to emitter-coupled logic, so they might squeeze another generation out of it. After that, in the 1990s, look for something a little more crazy."

Kutnick added that the core technology will not change from that of the 3090 and that Summit probably will incorporate more pipelining and significantly improved interprocessor communications.

Gens predicted Summit will include an integrated data base machine and that it will use some RISC technology for special-purpose processors within the system, but that the system software will have to mask that technology from the applications.

Summit will present yet another challenge to PCMs NAS and Amdahl. However, observers agreed that if IBM does gain new customers in the next few years, it will be at the expense of some BUNCH companies, rather than at the expense of the PCMs.

Analysts and customers reacted favorably to the high-end PCM product additions last year in terms of promised performance and pricing. To outbid IBM for new contracts, NAS and Amdahl may have to undercut IBM's pricing by 20%. But several analysts agreed that the PCMs will tend to steal customers from each other, not from IBM, this year.

One consultant noted a role reversal for NAS, which is scheduled to deliver its AS/XL during the second quarter of this year, and for Amdahl, which plans to ship its first 5890 systems in the second quarter with other models set for delivery late this year and in 1987. That shift for NAS and Amdahl reportedly has NAS, which often has been recognized for its price-cutting, focusing on improving its technology with the new generation in comparison to earlier systems. Meanwhile, Amdahl, with a reputation for emphasizing technology over pricing, has adopted the more aggressive role in pricing, similar to NAS' earlier approaches.

NAS and Amdahl also are expected to continue diversification efforts begun in recent years. Those efforts have focused on peripheral sales, which can be a more stable revenue source than processors, and on communications equipment, particularly

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in Amdahl's case.

Several observers expect Amdahl to strengthen its ties with its best customer, AT&T. Those ties could lead to an AT&T equity interest in Amdahl — if federal authorities allow it — and could give AT&T the mainframe market foothold that it needs to battle IBM toe-to-toe in all markets as the world's information processing king.

Among vendors of smaller machines, Nixdorf Computer Corp. is expected to bring to the U.S. the 4381-compatible system that parent company Nixdorf AG introduced in West Germany, Austria and Switzerland in the fall, the 8890 D series. In addition, Global Ultimacc Systems, Inc., which previously sold systems made by the defunct Magnuson Computer Systems, Inc., has a marketing agreement to handle NAS' 4300-class 6600 line. One industry expert notes that several other vendors in that mid-range PCM market are at the "hopeful" stage, trying to solve compatibility problems, supply problems and marketing problems.

■

Breaking up the BUNCH

No, there is no such company known as BUNCH. But in mainframe computing lingo, it often is easier to say that there is IBM and the BUNCH — five mainframe vendors who do not mimic IBM's architecture but who each hold on to market shares ranging from 9% to less than 1%.

In fact, the BUNCH companies are a diverse group that compete with each other as well as with IBM and that tend to target their own special niches in the market.

They focus on science and engineering, specific government branches, retail, banking and industrial control.

Dropping out of the mart

But in an age when it takes three or four years to develop a mainframe and only months for IBM or a start-up to make that system obsolete, industry observers are watching for signs that one or more of the five will drop out of the market or be absorbed by a deep-pocketed multinational sponsor.

Analysts also expect more OEM agreements allowing the BUNCH companies to repackage other vendors' products.

"I think in the next year, maybe two years, you will see some of these companies as acquirers, but more than three years out they may be acquired themselves," said Steven Milunovich, an analyst with First Boston Co.

Leading the BUNCH

The "B" in BUNCH is Burroughs Corp., which observers believe is intent on continuing its own product development. Estimated to have about 9% of the large-scale market, Burroughs introduced its high-end A 15 and mid-range A 10 systems in 1985.

Burroughs has fought to get into government markets in recent years and is expected to continue to expand its presence there as well as in the finance and education markets.

> **"**
>
> ***In an age when it takes three or four years to develop a mainframe and only months for IBM to make that system obsolete, observers are watching for signs that one or more of the five BUNCH firms will drop out of the market.***

"Burroughs seems to be committed to keeping its own mainframe technology alive. I haven't seen them winning too many major new contracts, but they are doing all right," observed Dale Kutnick, an independent consultant based in Wayland, Mass.

The "U" in BUNCH is for Univac, which is now part of Sperry Corp. The computers are still commonly referred to as Univacs.

Sperry talked unsuccessfully about merging with Burroughs in 1985, so speculation about Sperry being acquired by someone remains. Sperry, which some observers consider the only mainframe vendor emphasizing AT&T's Unix as an operating system for its full line of products, reportedly has been holding on to its base in education and the utilities while trying to expand its defense and banking market bases.

Sperry is seen as being in the middle of its high-end 1100/90 life cycle, but the firm is expected to replace some mid-range systems with a system code-named "Swift" in 1986 or 1987.

However, Sperry also recently announced it is considering links with Hitachi Ltd. for peripheral products and technology within Sperry's 1100 architecture.

NCR Corp., the "N," is said to be ready to offer a new high-end processor, but even that will perform fewer than 10 million instructions per sec-

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ond (MIPS). Kutnick maintained that NCR makes "basically a big minicomputer."

NCR is expected to concentrate on serving merchandisers such as large department store chains with computing systems ranging up from point-of-sale networks, leveraging the market from where it drew its original name — National Cash Register.

The "C" in BUNCH is Control Data Corp., the Minneapolis company that had its share of financial problems in 1985 and is considered by many a candidate to be acquired as a whole or in pieces.

CDC announced its Cyber/180 systems in 1984 and has concentrated on the education, scientific and engineering markets. The high-end of the Cyber/180 line — the Model 990 — will be delivered to its second customer in January.

CDC is one of those companies fighting to hold its mainframe base. The company took its name off one of its most visible product lines when it formed ETA Systems to produce the Cyber 205 supercomputer and the scheduled ETA-10 supercomputer.

The rationale behind that move was to split off from mainstream operations the development and marketing responsibilities for supercomputers.

"For all intents and purposes, they [CDC] are concentrating on survival. I can't see them doing anything but losing ground in the mainframe market. The only niche they seem to have is the scientific market, and the problem there is that guys like IBM and Amdahl are significantly improving their own products in that area," Kutnick said.

Honeywell, Inc. is the "H" in BUNCH and a company estimated to own about 7% of the large-scale market.

Honeywell introduced its DPS 90 series of mainframes in April for delivery late in 1985. That series of five processors was the first product line of a Honeywell-NEC alliance. The DPS 90 is based on NEC's S-1000 mainframe.

Honeywell is expected to concentrate its efforts in established markets such as the manufacturing industry where Honeywell got its start in selling control systems.

"Instead of looking for new markets, Honeywell is going back to its roots, in controls," First Boston's Milunovich said.

— James Connolly

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Desktop computing

No longer strictly personal

By Eric Bender

During the past few years the microcomputer has transformed itself from a shiny new high-tech toy to a standard business appliance that often appears as useful but as anonymous as the phone. But while the glamour of personal computing has faded, the technology keeps marching on, offering an ever wider choice of resources that just might help to solve problems.

In the next year or two, high-end desktop devices will continue their evolution toward multi-million instructions per second (MIPS) machines, with graphics displays reaching a level of resolution only engineers commonly see today, with links being forged into a vast world of data within and without the corporation and with a broad range of optional integrated voice- or image-processing services.

> ***Pinpointing which new products will find a home is a perilous business, with the only safe bet being that no real-world implementations will go as smoothly as predicted.***

Most likely these little powerhouse machines will still be called personal computers although that may be misleading. Often they will be seen less as computers than as fairly intelligent front ends to other systems such as videodisk players. And the "personal" part of personal computer may seem to disappear when the device becomes a diskless end node on a distributed network that downloads programs and accesses files under the watchful eyes of centralized DP/MIS.

Meanwhile, a new crop of application software should offer significantly greater ease of use and flexibility, taking advantage of graphics in noncosmetic ways. Software also will incorporate a growing flavor of artificial intelligence technology, with some of the first practical "software assistants" making an appearance.

As usual, and for very good reasons, the marketplace will lag behind the technology, with the bulk of the installed hardware base remaining garden-variety IBM Personal Computers and the like for several years.

Pinpointing which new products will find a home is a perilous business, with the only safe bets being that no real-world implementations will go as smoothly as predicted, that everything will take longer and cost more than expected and that technical improvement alone will not guarantee anything.

In many cases, acceptance of technological advances will be stalled until they receive blessings from standards setters, which in personal computers usually means IBM. One historical example is microfloppy drives, a mature technology that offers significant benefits over minifloppies but remains on the periphery because Big Blue has not spoken.

Next-generation desktops will be built around 32-bit chips that put most of a high-end supermini CPU on a tortured piece of silicon smaller than a postage stamp. Various contenders are worthy entries from a technical point of view, including Motorola, Inc.'s 68020; AT&T's 32100; and National Semiconductor Corp.'s 32032 on the open market and Digital Equipment Corp.'s Microvax II and

ILLUSTRATION BY ROB SAUNDERS

other chips in proprietary machines.

But the most likely to succeed is the newest chip off the block, Intel Corp.'s 80386.

The 80386 will provide sustained performance of 3 to 4 MIPS and virtual memory capacity of more than 64 trillion bytes — 32 times the size of the U.S. gross national debt in dollars, noted David House, vice-president and general manager of Intel's Microcomputer Group.

State-of-the-art chip

The 80386 is a key ingredient because it provides "total state-of-the-art architecture" along with compatibility with the CPUs in current IBM micros, said Microsoft Corp. Chairman Bill Gates.

As such powerful general-purpose CPUs arrive, "the notion that there is such a thing as a special-purpose machine goes away," Gates predicted.

With the chip expected to ship in volume in second-quarter 1986, systems based on it should begin appearing in 1987. The first such machines are likely to be multiuser systems or network servers, and 80386-based systems will migrate over time toward high-end single-user machines.

> ***'Everyone's waiting for Microsoft and MS-DOS 4.'***
>
> — Maureen Fleming
> Digital Information Group

However, it is worth noting that despite the dominance of Intel chips in personal computers, none of the company's processors introduced after the 8088 has found a place in the sun as quickly as expected.

Another heavyweight

Among other heavyweight silicon contenders, a compact version of DEC's Microvax II clearly is on the way. DEC has shipped well over 5,000 of the current Microvax, which W. D. Strecker, vice-president of engineering product strategy at DEC, described as a "deskside" system. "Within the near future you will see a desktop implementation of VAX," he said.

Some experts predict a significant role for reduced instruction set computer designs in silicon, although a majority questions whether the potential performance advances will outweigh compatibility problems.

Similarly, symbolic processor architectures are making the shift into very large-scale integration, with desktop systems beginning to appear in the next two years. This move will go hand in hand with "a change in general-purpose computers to make them more efficient at symbolic processing," predicted Symbolics, Inc. President Russell Noftsker. "The differences between symbolic architectures right now and general-purpose architectures are going to disappear in the near future."

Graphics processors

Elsewhere on the hardware side, dedicated graphics processors will handle the processing required for the high-resolution screens, and designs increasingly will add a general-purpose CPU to handle I/O.

And 1M-bit random-access memory (RAM) chips will quietly proliferate. Barring unforeseen supply shortages, RAM costs will continue to drop to a level that would have seemed ridiculous a few years ago.

Tapping all this low-budget power will require major upgrades in operating system software. MS-DOS is being rewritten one more time to boost support for multitasking, networking, extended memory and graphics, but IBM and MS-DOS author Microsoft are preserving discreet silences about what exactly lies ahead.

Even the occasional delphic revelations, such as IBM Entry Systems Division head William Lowe talking about a multiuser MS-DOS, may give conflicting signals. In Microsoft's view, "multiuser" here means not "shared CPU" but "multitasking with network hooks."

Asked what those hooks might contain, Gates replied that the upgraded software will not be dramatically different. "It will rely more and more on the server and view it as integral part of the system."

Naturally, the new soft-

What To Do When You're On The Ropes.

ware must also make peace in some way with emerging IBM communications standards such as LU6.2.

On the memory side

On the memory side, software developers are still waiting for the official word on how to bypass the 640K-byte direct-address limitation, and without it, they really cannot take advantage of the Personal Computer AT's Intel 80286 chip. "Everyone's waiting for Microsoft and MS-DOS 4," said Maureen Fleming, president of the market research firm Digital Information Group in Stamford, Conn. "It's a mess."

While many suggest that there is some fundamental incompatibility in the marriage between MS-DOS and the 80286, most likely in the silicon, Microsoft denies it.

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> *'Within the near future you will see a desktop implementation of VAX.'*
>
> — W. D. Strecker
> DEC

IBM and Microsoft both feel that the answer continues to lie in providing extended memory addressing in the 80286's protected mode, Gates said. The 80286 operates in both real and protected modes, in the first case mimicking earlier processors and in the second case handling many system functions in hardware. The two modes are incompatible, and Microsoft has been grappling with the problem of running existing packages in extended mode.

A joker in the pack

But there is a joker in the pack for software developers — the Lotus/Intel/Microsoft Expanded Memory Specification (EMS), released last spring, which offers a way to address extra memory without a tremendous rewriting effort.

Many said they believe the EMS will establish a standard for memory management on both 8088- and 80286-based machines. "It's a little kludgey," but it will do the job, maintained Compaq Computer Corp. President Rod Canion.

Others disagree. "Much too much has been made of the EMS," said Ashton-Tate President Edward Esber. "I still can't afford to design a memory configuration above 640K. IBM could change the rules overnight."

While there is also controversy about graphics environments — whether IBM will migrate its Topview environment to a graphics version, whether Microsoft will establish Windows as a standard or whether some dark horse will appear — there is little doubt that the potential user benefits are huge.

A graphics-environment standard offers three main pluses, Gates said. First is the chance to offer a common user interface across various applications; "character-based interfaces will never be consistent," he noted. "Second, you can do rich, rich documents and third is the screen bandwidth" — the heightened ability to deliver information quickly and intuitively."

Next-generation software

"Next-generation software has to be made for the 80386, built for a graphics environment, incorporate artificial intelligence front and back ends, be mainframe and mini cognizant and cognizant of other data as well," Esber forecast.

While AI content has been overhyped in many early products, the technology offers the promise of major advances for micro software. Among these, Esber said, are the ability for computers to "do what I mean, not what I say," to embody and transfer knowledge and to redefine computer literacy.

Many within the artificial intelligence community feel that beginning to fulfill AI's promise will require hardware that will not make it down to the desktop for years.

"There's sort of a game being played" by some hardware vendors promoting their machines that way, Symbolics' Noftsker insisted.

However, "people are addressing needs at very different levels," remarked John Spencer, vice-president for marketing and sales at Teknowledge, Inc.

As one example, he said,

small and relatively unsophisticated knowledge systems can answer some user demands. "Just because we've proved the technology's reliable doesn't mean we should abandon it."

Another slant on AI is offered by Microsoft's upcoming "softer software" and similar programs expected from other leading vendors such as Lotus Development Corp. These packages will bundle in a software assistant outfitted with a constantly updated knowledge base covering user preferences. "The software starts to interact with you; it seems to act like it sort of understands your intent," Gates said. "It's not static."

In addition to new kinds of applications, today's major packages will get facelifts and additional features, with the trends being toward natural language front ends, macros and a variety of communications links.

As the hardware is strengthened, software packages will be extended dramatically. One example lies in word processing: "With the 80386, I could do some decent grammar checking," said Camilo Wilson, founder of Lifetree Software, Inc. That, in turn, could support features such as a thesaurus that pops up not only with synonyms but with related concepts.

Here are some safe bets: Modem hardware will keep shrinking and getting cheaper, and users will continue to migrate towards higher speeds, with 2,400 bit/sec. becoming a standard for asynchronous links. Costs for local-area network interfaces also are dropping. Somewhere down the road, many expect, IBM Token-Ring network hardware will be as standard as RS-232 ports are now.

But the outlook for the grab bag of voice/data products is not clear at all. Each year, small vendors offering technically interesting products crash and burn. The most promising integrated personal computer/phone combinations, such as Compaq's Telecompaq, emphasize not the latest technology but attention to prosaic details like simple English labels on function keys.

In voice response, the situation is exactly opposite: The market is still waiting for a technological breakthrough to produce affordable and robust systems. The current drawbacks of voice response equipment running off micros are displayed during trade show demonstrations, when sales personnel don microphones and slowly repeat words as if they were giving commands to rather unintelligent dogs.

> ***While many suggest there is incompatibility in the marriage of MS-DOS and the 80286, Microsoft denies it.***

Recognition rate of 97%

Once trained to a given speaker, systems typically achieve a 97% to 98% recognition rate, said Ed Marcato, marketing manager at Kurzweil Artificial Intelligence, Inc.

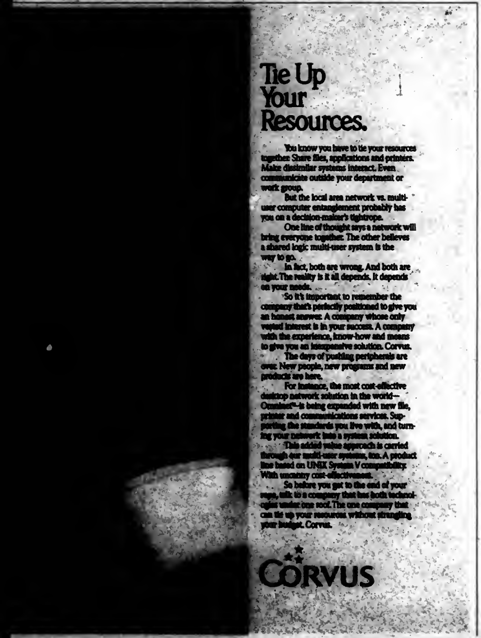
The equipment differs in size of vocabulary, in ability to filter out extraneous noise and in other niceties, he said.

The Kurzweil Voice System, which handles 1,000 words, has been sold to about 100 customers since shipments began in June. Sample applications include both traditional voice response situations — in environments where the user's hands are already busy, such as quality control — and office applications. In one case, the system could act as a front end to Artificial Intelligence Corp.'s Intellect mainframe data retrieval system, Marcato remarked.

Among other voice technologies, voice-synthesis and voice-mail techniques are more mature, but they make the most sense when implemented on centralized systems, according to office systems consultant Tom Billadeau of TRB & Associates.

More for less

It is not news that magnetic storage keeps offering more in less — higher density floppy disk drives, desktop hard disk drives with hundreds of megabytes and small and easy-to-use tape



Tie Up Your Resources.

You know you have to tie your resources together. Share files, applications and printers. Make dissimilar systems interact. Even communicate outside your department or work group.

But the local area network vs. multi-user computer entanglement probably has you on a decision-maker's tightrope.

One line of thought says a network will bring everyone together. The other believes a shared logic multi-user system is the way to go.

In fact, both are wrong. And both are right. The reality is it all depends. It depends on your needs.

So it's important to remember the company that's perfectly positioned to give you an honest answer. A company whose only vested interest is in your success. A company with the experience, know-how and means to give you an inexpensive solution. Corvus.

The days of pushing peripherals are over. New people, new programs and new products are here.

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So before you get to the end of your rope, talk to a company that has both technologies under one roof. The one company that can tie up your resources without strangling your budget. Corvus.

CORVUS

backup systems.

Optical storage devices will receive dramatically more attention in 1986, with compact disk read-only memory (CD-ROM) players hooked to personal computers grabbing the spotlight. In addition to storing standard on-line textual information, CD-ROMs are capable of handling any other digitized information, such as pictures or audio, so many upcoming jobs for the drives are not immediately apparent.

> **,,**
>
> ***Somewhere down the road, many expect, IBM Token-Ring network hardware will be as standard as RS-232 ports are now.***

Within large corporations, early users will come from three groups, according to Peter Rudnicky, DEC's marketing manager for CD-ROM Publishing Services. These groups include libraries, "information intermediaries" such as market researchers and anyone with a lot of data to distribute internally.

A pilot project for internal distribution of machine-readable files at a corporation with 200 or 300 CD-ROM drives might take two to three years and cost $400,000 to $500,000. The cost may be less if software is developed in-house, Rudnicky estimated.

One potential holdup for CD-ROMs — the lack of domestic supplies of disks — seems to be vanishing. A 3M Corp. factory now is ramping up and Sony Corp. promises to begin production in this country in early 1986.

Application software may represent a longer term limitation.

The players offer "relatively slow access times, an

Outlooks '86

"In 1985 AT&T drove Unix. Utilizing their Unix-based computers, they created several vertical market niches, specifically in hospital administration, legal services and in auto dealerships. AT&T's marketing efforts have led to acknowledgment of Unix as an operating system for commercial businesses. Major insurance companies and manufacturing operations have considered or are actively purchasing Unix-based equipment."

— Jean Yates,
vice-president,
International Data Corp.

"One major event that occurred in 1985 was that the local-area network market started to arrive. It was, of course, expected in 1984. It should begin to take off in 1986. As we get more [local-area nets] there will be more software for them. As people start interconnecting their PCs you'll see office automation develop from the bottom up. In 1986 the small multiuser systems will use a lot of [Microsoft Corp.] Xenix and [AT&T] Unix. By the end of the decade, Unix will have 5% to 6% of the computer marketplace.

Another area of development is that the mainframe software vendors are creating versions of their software for the PC. It's kind of strange when for $500 you can buy a product that costs $100,000 on a mainframe.

The biggest challenge coming up in the next two years is to get a multitasking version of [Microsoft] MS-DOS working. That will allow people to integrate into a better behaved, more controlled environment."

average of about a second," Rudnicky said.

If the retrieval software lingers over its tasks, the overall system may seem very slow to computer users although on-line subscribers may see it as relatively quick. On one CD-ROM system at Comdex/Fall '85, response time dragged on into seconds, even for some tasks that did not require accessing the player.

Larger write-once optical systems also are emerging quickly, but their high price tags will keep them away from the desktop in archival applications, at least in the near future. Meanwhile, practical erasable optical systems still seem three to five years away.

> **"**
>
> ***Many said they believe the Lotus/Intel/Microsoft Expanded Memory Specification will establish a standard for memory management on both Intel 8088- and 80286-based machines.***

Elsewhere among peripherals, the movement toward nonimpact printers keeps accelerating. As one illustration, Dataquest, Inc. estimated that North American sales of $10,000 and less expensive laser printers will climb from 49,000 in 1984 to 107,000 in 1985 and to 199,000 in 1986. Hardware prices are plummeting while features are added, and sophisticated graphics-oriented software is appearing.

Research and development efforts are showing different degrees of success in other, specialized applications.

The greatest technical problem for laptop micros — finding an easy-to-read screen with low weight and minimal power draw — remains unsolved. Some progress may be made — for example, the upcoming AT&T laptop's screen uses shading to simulate four-color dis-

Think Along The Same Lines.

The battle rages. Networks vs. multi-user systems. Today, conflict reigns.

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'85

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play. But LCD, backlit LCD, electroluminescent and plasma designs all suffer from serious drawbacks.

Image processing with personal computers, which consultant Fleming described as "a market on the brink," is just beginning to draw the required crop of software. Current applications range from swapping documents back and forth between remote locations — easily revising them at each site — to teleconferencing to signature verification.

A sobering perspective on image processing, however, is raised by the Wang Laboratories, Inc. PIC, a desktop system first announced two years ago that is yet to play a major role in office automation. Wang currently is emphasizing PIC-like capabilities as part of a centralized, shared processor system. "We're getting away from a microprocessor-based solution and moving to the VS world," said Estal Fain, director of product marketing.

In another job, the micro acts as a front and to a videodisk player, creating an interactive video system. This technology is mature and beginning to see broad-scale adoption.

Training applications

Many early applications will be in training factory workers, because defining needs is relatively straightforward, said Nate Kalowski, marketing vice-president at Visage, Inc. One very large manufacturer has committed to buy thousands of interactive video systems, he said.

The flow of inventions seems unending. Among the most intriguing, at Comdex/Fall '85 Panasonic Industrial Co. linked a television camera to an optical storage system and hooked up an Apple Computer, Inc. Macintosh that ran editing software, giving users a spectacular array of video capabilities.

Other products seem to appear out of the blue, such as Cauzin Systems, Inc.'s Softstrip, which stores data and programs on paper printouts.

But among this cornucopia of computer blessings, what do users want? Cautionary notes are common.

"The gap between what a person uses and what we provide has gotten larger instead of smaller," Ashton-Tate's Esber remarked. "We never get to discuss when enough is enough."

"We're in technological overspeed," commented Software Publishing Corp. President Fred Gibbons. "With products like the Personal Computer AT and Windows, we may have gone way beyond the user. We have to make sure we still address professional needs." ■

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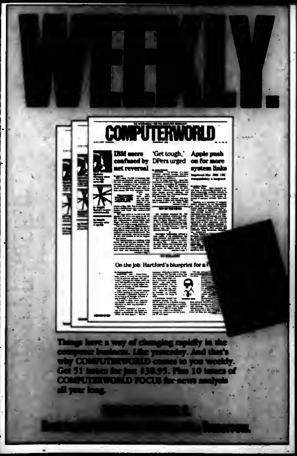
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Communications options

The world beyond AT&T

By John Dix

During the past year, telecommunications users were able to retire some of the many balls they have been juggling since AT&T divestiture in January 1984, but keeping the remaining spheres revolving smoothly has not been a picnic.

Although better equipped now, communications users in the postdivestiture era find that life is still complicated and made ever more so by flourishing options.

Nowhere is this more apparent than in wide-area networking. More alternatives have probably surfaced in the market for long-distance services than in any other transmission area. While rich with potential, the alternatives are still out of reach for the majority of users who, for the most part, are still doing battle with the lingering effects of divestiture.

Juggling is an apt metaphor.

At the same time they have to contend with rate revisions that affect their existing services, users must also examine newly tariffed services, monitor and gauge the importance of new technologies, measure the viability of carriers and orchestrate services from multiple suppliers to form a harmonious system.

As if that were not enough, communications managers are also expected to make optimal, cost-effective use of existing networks and explore potential means of using communications to get a leg up on corporate competition.

Time has not even helped assuage some nightmares created by the AT&T breakup. The considerable day-to-day task of network maintenance did not get any easier in 1985 compared with the frenzied year of 1984. Pinpointing problems and coordinating maintenance for networks composed of separate local and long-haul carrier components is still a bear. Carriers have a nasty habit of finger pointing and blaming failures on each other.

"Our frustration with facility repair and maintenance did not improve in 1985," said Daniel Mandreger, senior engineer with Consumers Power Co. in Jackson, Mich. "If anything, it's gotten worse."

That lament is echoed over and over again. "Many things we used to call Ma Bell for when it took end-to-end circuit responsibility you have to do on your own now," said William G. DuVall, vice-president of network operations for Compuserve, Inc., the Ohio-based company that provides time-sharing and home computer services. "We've had to beef up network control and support staff considerably to handle the load. We've also rewritten a lot of tools so it's not as bad as it was before, but I don't think it's getting any better."

Although better equipped now, communications users in the post-divestiture era find that life is still complicated and made ever more so by flourishing options.

Few companies have escaped unscathed, regardless of size. "Divestiture has put more of a burden on customers. We're coping with it and doing well, but it has been a challenge," conceded Gerard R. Weis, vice-president of data communications and software services at Sears Corporate Communications, Inc., the wholly owned subsidiary that provides Sears, Roebuck & Co. with communications services.

Some smaller companies have been hard pressed. "Our company is in an austerity crunch so we have to deal with more problems and difficulties on a daily basis with the same number of people," Mandreger said.

There was, however, a positive aspect to the situation. Competition among vendors is rampant. A buyer's market is in the making, and the forces at work there will ultimately determine fair market service rates. Flux is creeping into service pricing. The goal of AT&T divestiture, it seems, has begun to bear fruit.

"There is more competition going on between AT&T and the divested Bell operating companies then there ever was before, and you're getting deals both ways," DuVall said.

Carriers are hungry. "Some long-distance companies are coming in and offering all kinds of things, like a free microwave shot to their [point-of-presence] and discounted rates," DuVall said. "There are some strange offers out there."

And they will probably get stranger as competition heats up. It is coming from all sides. Established carriers are offering bulk bandwidth, which users can chop up and employ as they wish. Carriers are also trying to retain customers with new types of services and pricing options.

New carriers are cropping up and leasing or selling capacity on long-haul, fiber-optic networks. Still other competition is coming from companies which sell equipment that enables users to install their own communications systems either to link to existing carriers or bypass all carriers.

Large companies have the greatest ability to take advantage of the new alternatives — they have the capital resources and in-house communications expertise needed — and the largest incentive: They stand to save the most.

For these users, the hot topic of the year was T1, a digital service consisting of 1.54M bit/sec. of bulk bandwidth that users can chop up and use as they wish. Although T1 can be used as a single very high-speed link, it is typically segmented by the user into 24 voice channels or an equal number of 56K bit/sec. data channels. The appeal of T1 is that it costs roughly the same as only 10 or 11 individual 56K bit/sec. digital channels.

Virtual networks

To address the voice and low-speed data needs of companies with widely dispersed facilities, many carriers have introduced virtual networks, viewed by some to be last year's most important communications development.

Virtual networks go by different names. AT&T's service, for example, is called the Software Defined Network and MCI Communications Corp.'s network is dubbed Virtual Private Network. Both will be deployed beginning early this year.

The basic idea of all virtual networks is the same. Users can tie small company facilities into the corporate leased-line network using dial-up connections, the configuration for which is stored in the memory of carrier switches. As tariffed, the service is an economical way to support locations that do not generate enough traffic to justify a leased-line connection to the corporate net and have traditionally used direct distance dialing or WATS lines.

MCI's and AT&T's virtual networks are both analog and aimed predominantly at voice usage but can be used for data transport at speeds up to 9.6K bit/sec. The services are made possible by specially programming carrier network switches.

AT&T claimed its Software Defined Network service, which is targeted at customers with at least 20 geographically dispersed sites, can shave up to 20% off users' communications bills.

Another service that bowed in 1985 that is expected to be of great importance beginning this year is AT&T's Megacom service, a bulk calling option said to be a tier above AT&T's present WATS service. Customers in the Fortune 500 that use WATS 1,000 hours or more per month can reportedly save roughly 10% on interstate calls.

The primary difference between WATS and Megacom is the mileage component used to calculate rates. WATS rates are calculated using mileage bands, five of which segment the country. As way of example, the monthly bill for a WATS customer who has Band 5 capabilities, which includes all of the U.S. and 3,800 hours of usage on 39 access lines, will be roughly $66,000 per month. The same service could be achieved with Megacom for $61,420 per month, for annual savings of nearly $55,000.

Awaiting Megacom

"Megacom is something a number of us have looked for for a long while," said Hallenbeck of Emery. "It will definitely save money, but 10% is probably a bit optimistic."

All of the tariffs AT&T approved by the Federal Com-

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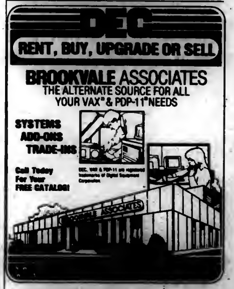
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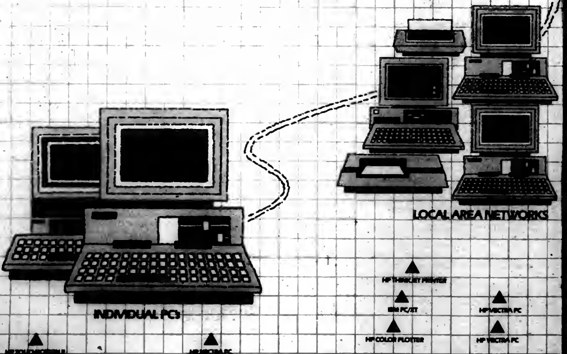

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FORECAST

munications Commission this past year — including new Software Defined Network, Megacom and private-line tariffs — share one thing in common: They unbundled the cost of local access and termination.

Disallowed by divestiture to provide end-to-end services, AT&T's new tariffs give the user the option to access its services in one of four ways.

These access options are through AT&T, which would act as the customer's agent and procure the necessary connections through the appropriate local telephone company; through the local telephone company itself; through an independent access vendor; or by building its own access link.

Two of the four access methods bypass the local telephone company. Bypass is a hot and controversial subject that built up steam in 1985 and has potential to boil over in 1986, more than a little aided by AT&T's new tariff structures.

"Unbundling the pricing shows the large user the underlying costs of the service. It says to a Fortune 500 customer, 'I'm paying 80% of the charge for access and termination, not the intercity portion of the service,' " according to Ken Leon, a security analyst with L. F. Roshschild, Unterberg Towbin in New York. This will encourage customers to seek access alternatives.

AT&T not sidestepping

AT&T once said it would not sidestep the divested Bell operating companies to reach large customers unless the local carriers were "unwilling or unable to provide access at market price/performance levels," according to Jerry Thames, general manager of AT&T Communications network services.

Only one customer to date, Merrill Lynch & Co. in New York, uses bypass facilities to reach AT&T, a deal cut for fear of losing the account to another carrier willing to provide direct carrier access.

Innocent? No. Although it may not be trumpeting bypass on the streets, AT&T is working behind the scenes. In September, AT&T even introduced a family of microwave bypass products. Leonard Klienrock, a professor of computer science at University of California at Los Angeles and president of Technology Transfer Institute, a conference group in Santa Monica, Calif., goes as far as to say, "AT&T is one of the biggest promulgators of bypass right now."

More locals bypassed

We will see more and more local phone companies being bypassed as users link directly to long-distance carrier network access points, according to Mark Winther, director of new communications services at Link Resources Corp., a market research firm in New York. "The local companies can't move quickly enough to change their tariff structures to keep them economical for large businesses."

> **'AT&T is one of the biggest promulgators of bypass right now.'**
>
> — Leonard Klienrock
> University of California
> at Los Angeles

From the local telephone company's perspective, the result is the same regardless if the impetus to bypass comes from the long-distance carrier or from the customer.

"The 10/90 rule applies here," Klienrock noted. "Ten percent of the business customers generate 90% of the business revenue. It's exactly that 10% who have the wherewithal and motivation to bypass."

Interconnecting buildings

In addition to using bypass to access long-haul carriers directly, users are employing the technology to interconnect local buildings.

Long-distance carriers are not immune to bypass. Many companies have installed their own private corporate networks, bypassing both local and long-haul carriers.

E. F. Hutton & Co. in New York is installing an end-to-end satellite bypass system that is expected to save the company $9.3 million over a seven-year period. The system will pay for itself in one year, according to Bernard A. Weinstein, first vice-president of communications and

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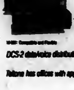

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branch information systems.

However, the cases cited are the exception, not the rule. Like T1, bypass is talked about more than actually used. It does have inherent risks.

"If you're going to put in fixed bypass facilities because its cheaper than a leased facility, you have to be confident the price of the leased facility won't drop to the point where your fixed facility is no longer economical," warned Alan Schaevitz, director of the San Francisco office of Network Strategies, Inc., a consultancy in Burke, Va. Short payback periods are a necessity.

Sometimes bypass is just plain uneconomical. "The public utility commission here in [Jackson, Mich.] has held the cost of channel facilities down for their customers so we have a hard time justifying bypass," Mandreger of Consumers Power said. DuVall of Compuserve noted, "Companies with limited capital budgets don't do that kind of thing."

As 1986 unfolds, users will attempt to evaluate, plan for and try to implement cost-effective communications alternatives such as those mentioned. They will also be taking furtive glances over the horizon to Integrated Services Digital Network (ISDN), that mysterious universal network solution.

ISDN gathered momentum in 1985 and will be beta tested this year. The idea is to provide an end-to-end, all-digital service that can be used to support any mix of voice, data or video.

"Everyone's goal is to reach the day when any telephone can make any kind of call. That is the world of ISDN," explained Bob Harcharick, president of MCI Digital Information Services Co. "We're all working on these things. We are also still working on just what ISDN means."

Supports two channels

With ISDN, a single residential telephone line — known in ISDN parlance as a 2B+D basic interface — would be capable of supporting two 64K bit/sec. channels: one presumable for voice and a 16K bit/sec. channel for signaling and/or packetized data transport, explained Daniel Minoli, a member of the technical staff of Bell Communications Research, a facility owned jointly by the seven regional Bell holding companies.

The primary rate interface used by business, known as 23B+D, would support 23 64K bit/sec. digital channels and one 64K bit/sec. D channel for signaling and packet support, Minoli said.

"Today, if I have three different needs for communications link I may have to get three different links," Schaevitz said. "ISDN promises multiple use of a fixed resource — the local loop — and gives better utilization of the available bandwidth."

> ”
>
> **'We are still working on just what ISDN means.'**
>
> — Bob Harcharick
> MCI Digital Information Services Co.

Besides offering a universal outlet that removes the need to have specialized interfaces for voice and data, ISDN promises to cost less than services offering the same bandwidth.

Most sources say that although nebulous, ISDN will be commercially deployed in 1987. The allure of technology can obscure reality. Witness Daniel Mandreger of Consumers Power Co. He is not as excited about bulk bandwidth services, 45M bit/sec. fiber-optic trunks, virtual networks, satellite shots, bypass schemes and ISDN as he is about being able to use push-button phones with his Centrex service.

"We've been working with rotary phones attached to a electromechanical [Centrex] switch that has been in service since 1963," Mandreger said. Michigan Bell is scheduled to install a new switch soon, which will offer such "advanced features" as call forwarding and conference calling. ■

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—Mr. Paul LoRusso, Vice President, Information Systems, AEMC.

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"INTELLECT confirms our commitment to getting information to our users quickly and efficiently."
—Ms. Patricia Walkow, Manager, Information Center, AEMC.

INTELLECT performs so well in giving end-users fast, easy English access to information, AEMC's Information Center plans to develop new applications, including one on hospital personnel. And new INTELLECT/SX (the "personal computing" mainframe version of INTELLECT) will allow even more departments to develop their own applications with minimal Information Center involvement—which may end the need for some users to maintain micro-based databases.

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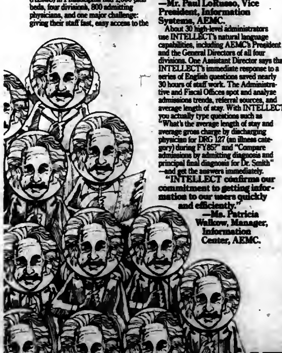

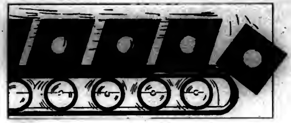

Programmer productivity

Never have so many done so little for so much

By Jeffry Beeler

For as long as anyone in the industry can remember, vendors and systems pundits have boldly predicted startling breakthroughs in the battle for improved programmer productivity. Each year, fresh reports of some newfangled methodology, language or productivity tool have stirred hopes that a technological millennium is at hand and that all software development woes will soon magically vanish.

But almost without exception, past promises of dramatic gains in programmer productivity have proved wildly inflated and have left many user organizations feeling bitterly disappointed with the results.

> ***Past promises of dramatic gains in programmer productivity have proved wildly inflated and have left many users feeling bitterly disappointed.***

The continuing inability of both vendors and users to come to grips with their software development ills has inevitably taken a severe toll. Today, many corporate MIS departments find themselves beset with a host of long-standing difficulties that seemingly defy solution.

Large companies typically devote 50% — in some cases, as much as 70% — of their total programming effort to maintenance rather than new systems development. Even when computing organizations do find time to work on future applications, their output per programmer often averages only five to 10 lines of debugged Cobol code per day. The combination of high maintenance requirements and low levels of individual productivity, meanwhile, has created huge application backlogs — hidden and otherwise — that have undermined DP management's credibility and alienated nontechnical end users.

Against the resulting backdrop of rising stress and falling programmer morale, turnover among computing professionals has climbed in many cases to as high as 25% per year.

Experts who specialize in such matters would like nothing better than to report that the future of programmer productivity holds infinitely greater promise than it ever has in the past. But sadly, practically no one with any knowledge of the subject sees much reason for great optimism. At least as far as applications development is concerned, this year will be cast in virtually the same mold as all the other dreary years that preceded it.

Once again, users will read with intense interest as dispatches from the technological front line glowingly describe the latest triumphs in the struggle against unproductive programming. Some of the purported advances, particularly microcomputer-based workstations and automated design generators, will undoubtedly gain widespread acceptance and may even contribute incrementally to improved systems productivity.

But barring divine intervention, no product now or in the future will come even close to yielding the 100% to 1,000% programmer productivity increases that many vendors breathlessly claim.

"Anyone who speaks of productivity improvements on the order of 50 to 100% or more is a fraud," according to Tom DeMarco, a

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principal with Atlantic Systems Guild, Inc., a New York-based consulting firm.

Despite vendor assurances to the contrary, the search for a revolutionary technology that will end development bottlenecks once and for all seems no closer to reaching its goal than it did previously. So like it or not, the vast application backlogs and other software-related headaches that have vexed large corporations for 20 years are likely to persist for a long time, DeMarco said.

DeMarco's skepticism is echoed by many others, including independent DP consultant Gopal Kapur, who expects the already sad state of programmer productivity to deteriorate even further during the months and years ahead. Although a handful of unusually well-run computing shops can realistically look forward to productivity gains as high as 20 to 40%, the overwhelming majority will find the going increasingly tough.

"The organizations that will see improvements in programmer productivity will definitely be the exceptions," according to Kapur, who heads the Danville, Calif.-based systems consulting firm of Kapur & Associates, Inc.

Why do the prospects for a dramatic turnaround on the programmer productivity front look so bleak? The reasons are manifold. Part of the problem stems from a pervasive conservatism that makes most MIS directors highly resistant to change. "The reluctance to take risks with new technology is rampant and prevents DP managers from selecting the tools that would best address their needs," according to Dan Walkovitz, president of Mainstay, Inc., which supplies aids for developing analytical applications.

Another reason that the programmer productivity problem seems unlikely to ease anytime soon is that a large percentage of systems executives are woefully deficient in technical know-how, according to Kapur, one of MIS management's sharpest critics.

"Ten years ago, the industry used to have a saying that DP managers were knowledgeable about technology and ignorant about people," he recalled. "Today, they are illiterate about both. Most of them, in fact, have so little technical expertise that they can't even ask the right questions to find out where they have problems."

This technological "illiteracy" has driven many information systems directors to drop even the pretense that they are still personally involved in the fight against inefficient development and has left them entirely reliant on vendors for solutions.

Productivity dilemmas

In the past, the quest for quick technological fixes to their programmer productivity dilemmas led DP managers to place their faith in tools like Cobol and fourth-generation languages. This year, they will increasingly seek salvation in vendor-supplied goodies like integrated graphics and word processing packages, which centralize documentation and electronically create data flow diagrams, and software that automatically restructures existing code, Kapur said.

But although the latest technological darlings will have their undeniable virtues, few will do anything to address the software design and requirements definition issues that lie at the heart of the programmer productivity crisis, he added.

And even if all new products that come down the pike were the computing equivalent of a Stradivarius violin, user organizations would still face an acute shortage of virtuosos to play them. In other words, only the most accomplished programmers will be able to exploit the potential of the latest tools.

However, the outlook for programmer productivity is by no means entirely devoid of bright spots. Consider, for example, intelligent programmer workstations, which are widely believed to have potentially far-reaching implications for application development.

As they are currently conceived, programmer workstations consist of selected Cobol programming aids and hard disk-based personal computers that serve basically the same coding function as a traditional IBM 3270 TSO terminal. The workstations also typically boast a sophisticated uploading capability that allows large-scale systems to be written off-line as a collection of modules and then shipped to a host mainframe for assembly and testing.

As a complement to conventional mainframe-based development, programmer workstations offer some conspicuous advantages. For example, they constitute a dedicated resource and thus provide faster response times than contention-ridden hosts, according to Chris Herrin, supervisor of development center and information center operations at Blue Cross of California.

To date, the use of programmer workstations has made only modest inroads at most major organizations like Crocker National Bank, which earlier this year began testing the first of 10 such machines as part of an ongoing pilot project. But in the very near future, installations of the workstations will almost certainly multiply. "A lot of companies seem to have at least their foot in the door and are looking in pret-

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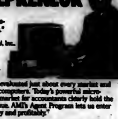

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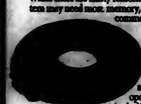

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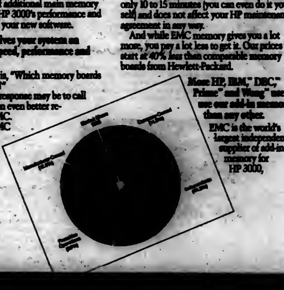

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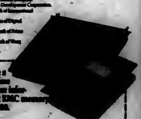

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No one is more committed to memory.

ty much the same direction, although some are apparently further along than others," according to Peter Katz, a project manager at San Francisco-based Crocker.

Katz sees the programmer workstation phenomenon as merely the latest chapter in the much grander saga of microcomputing's growing infiltration of big business. The invasion began when large numbers of micros started making their way into the hands of engineers and other skilled technicians. Now, the influx is entering a second phase in which the devices are slowly but relentlessly spreading to professional programmers and their MIS coworkers.

A somewhat different portrait of workstation evolution is painted by Paul O'Grady, vice-president of worldwide sales and marketing at Palo Alto, Calif.-based Micro Focus, Inc. At present, O'Grady said, personal computers play only a comparatively minor role in the application development process, where they serve primarily as an extension of installed mainframes.

But now that IBM has finally announced its long-awaited Token-Ring network, micros suddenly find themselves poised on the brink of a fundamentally new mode of operation. Soon, the machines will gain the necessary technology not only to continue supporting the familiar 3270 TSO development environment but also to be interconnected to form local networks in which mainframe applications will be created collectively.

Networks of programmer workstations promise to augment software productivity by promoting resource and data sharing and by enabling many development tasks to be off-loaded from the host mainframes. The use of networked workstations will also stimulate the development of multiuser applications that will take advantage of important leading-edge technologies like graphics and system prototyping, O'Grady said.

■

Crocker explores workstation path

Many profound differences separate Crocker National Bank and Blue Cross of California. One ranks among the largest U.S. providers of banking and financial services. The other is known far and wide as a mass processor of medical insurance claims.

But in at least one notable respect, the two organizations are in complete accord: Both have already begun to explore the use and potential productivity gains of programmer workstations, and both expect their efforts to continue this year.

Crocker National Bank has already installed a limited number of the machines in its internal systems organization, and Blue Cross is seriously exploring the possibility of doing likewise although the idea has yet to receive formal approval.

Moreover, by no stretch of the imagination are Crocker and Blue Cross' activities atypical. All across the U.S., countless other companies are contemplating similar workstation evaluation and development projects.

Crocker's experiment with programmer workstations was launched about 18 months ago when it began evaluating prospective hardware and software modules. Then, last June, the process entered a new phase when a single prototype of the bank's programmer workstation found its way for the first time into a production environment, according to Crocker project manager and systems officer Peter Katz.

Since then, Crocker has installed a total of 10 workstations, each incorporating a 640K-byte IBM Personal Computer XT and supporting an assortment of commercial software packages that the bank has integrated under its own proprietary shell.

During this year, Crocker expects its workstation installations to continue. "We already have quite a few [additional workstations] budgeted for next year and plan to roll them out gradually in the areas where they will be most justified," Katz said. "The first place where we'll put them will probably be development."

With the right modifications, workstations might also prove helpful to Crocker's nontechnical end users. So the bank is preparing a second such system that would replace Cobol Workbench with development aids like spreadsheet packages but would otherwise be configured with basically the same software as the programmer workstations.

More homework needed

Blue Cross, in contrast, wants to give the programmer workstation concept some additional thought before deciding whether to proceed with a pilot project. "We have to do a bit more homework first to see how the notion is likely to be received," according to Chris Herrin, the organization's information center and development center supervisor.

On paper, though, programmer workstations look promising. "What we're thinking of doing is to decentralize some of our coding activities," Herrin said.

Whether programmer workstations will ultimately prove effective remains unclear. "On the development side, the workstations seem to be improving our programming productivity rather significantly," in a few cases by as much as 33%, Crocker's Katz said.

"On the maintenance side, the preliminary results are somewhat less favorable."

In the end, Crocker hopes to extend the workstation concept to support the application development process as a whole, not just the coding stage, Katz said. ■

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One company's story

How Computervision weathered the storm of '85

By Rosemary Hamilton

The events of last year, conveniently clumped under the heading "computer industry slump," did more than halt a winning streak or temporarily dull the industry's shine. To many computer companies, 1985 marked a turning point, a time when they either began to overcome the long-simmering troubles that the slump exacerbated or a time when they let the slump drag them deeper into the backwaters of the industry.

One company at this juncture is Computervision Corp. of Bedford, Mass. The road it has traveled since first pioneering the computer-aided design and manufacturing market 16 years ago mirrors that of many a high-tech company. Founded in the late 1960s by entrepreneur Philippe Villers and Martin Allen, who is still chairman of the board, the company struggled to convince the market of its CAD/CAM concept.

As the concept took off, so did Computervision's fortunes. Throughout the late 1970s and early 1980s, it had a steady rise in revenue. In 1984, it landed on the Fortune 500 list as a half-billion-dollar company with its highest revenue ever, big profits and plans for major expansion. It seemed to embody the fervor of the industry in general.

But like many other computer companies, there were problems lurking in the shadows. For Computervision in particular, it was a growing flaw in its product line and increasingly fierce competition, most notably from IBM. Although in the process of a project to convert its systems to conform to industry standards, Computervision was selling proprietary stand-alone systems that were rapidly losing market appeal. And last year, when the slump brought problems like these to the foreground, Computervision and those companies in similar predicaments really got socked.

Computervision now wants to turn things around. But just exactly where it goes from this pivotal point remains to be seen. It has set into motion two major plans. First, the company is undergoing a major face-lift — streamlining management and administration, marketing and research and development — so it can survive in a more crowded, less growth oriented market. Second, it has focused nearly all resources on the completion of its product transition project, a major undertaking that, put simply, involves porting its software from those proprietary systems to a networked, industry-standard-based environment.

> ***In 1985, when the slump brought problems to the foreground, Computervision and those companies in similar predicaments really got socked.***

At the close of 1985, Computervision had put many of its reorganization plans into place. The second plan — speeding up the product transition project, which commenced back in 1983 — is on schedule and is expected to be finished sometime in 1986, according to James Baar, vice-president of communications.

But Baar is the first one to caution against too much optimism. "We're not out of the woods yet," he said in a recent interview. Computervision still considers itself in a pre-

ILLUSTRATION BY KEN CONDON

carious position. In fact, James Berrett, chief executive officer, and Robert Gable, chief operating officer, refuse interview requests in such uncertain times, according to Baar. Gable took over day-to-day operations from Berrett last year, a move that is perhaps the most symbolic of all changes made at Computervision.

Gable, who was a director of the company for 11 years and a vice-president of Kidde, Inc., is a "professional manager from the accounting fraternity," according to Barr. He is responsible for tightening up the organization, whereas Berrett, who retained the title of chief executive and president, focuses on strategic planning. In replacing Berrett, whom Baar described as a "brilliant CAD/CAM whiz kid," Gable took away the company's emphasis on technology and substituted a bottom-line focus.

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> ***'If users see Computervision go down, they won't know who to trust anymore. Almost everybody is rooting for them.'***
>
> — Charles Foundyller
> President of the research firm Daratech, Inc.

Such a shift was commonplace in the industry last year as high-profile companies like Apple Computer, Inc. and lesser known start-ups like Higher Order Software, Inc. in Cambridge, Mass., replaced their technology-oriented leaders with seasoned businessmen more suited for a maturing industry.

In 1984, few Computervision employees — from the top brass down to the security guards — would have suspected this bottom-line approach was around the corner or that the operative words would soon be "contrpl," "sharper focus" and "cut costs." After all, this was a high-flying, high-technology company, whose earnings had increased by 35% to $47.7 million in 1984. "When you're growing, there's an atmosphere that nothing can go wrong," Baar said. "It's a very heady."

That year, Computervision ranked No. 1 of all CAD/CAM and computer-aided engineering vendors, according to Daratech, Inc., a CAD/CAM research firm in Cambridge, Mass. It had a lock on 20% of the market and had its highest year-end revenue ever — $556.3 million — to show for it. In addition to reigning supreme in the traditional CAD/CAM market, the company was also branching out, finding new markets for CAD/CAM applications, such as race car design.

Then 1985 began. IBM, which, ironically, had forged a partnership of sorts with Computervision in 1984, steadily chopped away at Computervision's market share.

Actually, Computervision was named an IBM value-added reseller, the fruit of which is the CDS-5000, a Computervision system used for CAD/CAM data base management. It is based on IBM Series 4300 hardware and runs Computervision's product data management (PDM) software. Charles Foundyller, president of the research concern Daratech, recalled a big promotion when this took place. "Computervision characterized it as a special partnership. They even showed this slide with a blue background and one hand gripping the other," he said.

As IBM marched onto Computervision's turf, outside economic forces — a drop-off in capital spending and the strong U.S. dollar abroad — put an even tighter squeeze on Computervision's ability to drum up orders.

Compounding this situation was the fact that Computervision had completed an extensive ramp up at the tail end of 1984. Baar said the company moved in to 1985 "with high expectations. We were prepared for a bigger 1985 than 1984." Consequently, the company increased inventories by 71%, added 1,000 new people and rented new facilities. Operating costs escalated as revenue decreased.

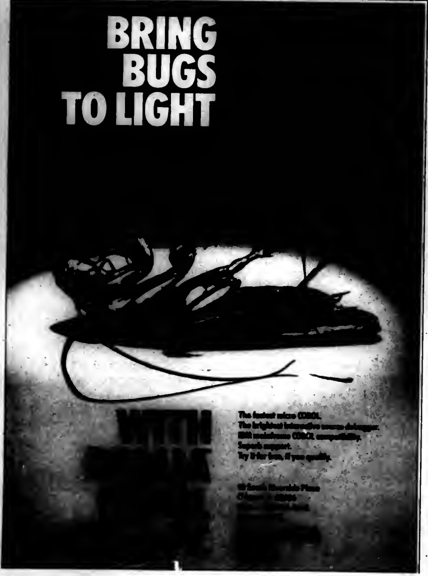
By the end of 1985, Computervision had fallen to third place behind IBM, which had captured a 21% share and had become the No. 1 CAD/CAM vendor, and Intergraph Corp. of Huntsville, Ala., which followed with a 15% share, according to Daratech. Computervision's portion had slipped to 12%.

The slip was reflected in last year's earnings and revenue. At press time, year-end results had not been released. But the damage, per quarter, was as follows: In the first quarter, the company reported a loss of $18.7 million on revenue of $105.8 million, down from net income of $10.7 million on revenue of $121.7 million in the same quarter of 1984. The second-quarter loss was $19.5 million on revenue of $112.2 million, compared with net income of $11 million on revenue of $133.5 million in the second quarter of 1984. A third-quarter loss came in at $20 million on revenue of $105.8 million, a 23% decrease from revenue in the third quarter of the previous year.

It was a hard lesson for Computervision to learn, but, "We have a company today of much more realistic people," Baar said.

Baar remembers when the seriousness of Computervision's problems became clear — shortly before the end of the first quarter in 1985.

In April, the company sent a letter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to its shareholders saying it now looked at the year as "more challenging than we anticipated only a few weeks ago. . . . Regarding the near-term outlook, we remain cautious primarily because of continuing uncertainties in the worldwide economy, the market lag that typically accompanies product line transitions and increasing competition."

Immediate response

The company responded to the sudden downturn immediately after the first quarter by making a number of changes, from reducing its staff by 1,600 people through layoffs and attrition to postponing research and development projects.

That was followed by Chief Operating Officer Gable's overall reorganization of the company into five operating groups — marketing and North American sales, international sales, worldwide services, research and development and manufacturing — a major departure from the various divisions under Berrett that each had their own marketing and R&D efforts.

As Baar put it, the company now has a "a marketing department that's all marketing." In early December, the company reassigned four corporate vice-presidents to head the streamlined divisions.

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> ***'We have a company today of much more realistic people.'***
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> — James Baar
> Computervision

With the divisions more tightly controlled, the overall corporate focus was put on the product transition project. The whole issue of product transition is really a story of Computervision being caught between the proverbial rock and a hard place.

CAD/CAM powerhouse

The company is a powerhouse when it comes to CAD/CAM software, having approximately 300 different applications packages in what it calls the Computer-Aided Design and Drafting System (CADDS) family. However, the software was written for Computervision's proprietary system, the CDS-4000, which at least one observer claimed is obsolete.

Computervision disputed that claim but did acknowledge that its future competitive edge is linked to industry-standard-based systems.

The core of Computervision's product line, the CDS-4000, is a multiuser design system made up of hardware based on the old Data General Corp. Nova computer. It has been enhanced through the years, and Berrett was quoted earlier this year as saying it is a state-of-the-art machine.

To compete with the likes of IBM, however, Computervision cannot hang on to this system forever. But it cannot abandon it, either. There is a huge installed base of CDS-4000 users; it runs the CADDS software, and, at a cost ranging between $350,000 and $500,000, the system is Computervision's real breadwinner.

So the company developed a strategy calling for a two-pronged product transition.

First, port all the CADDS software that runs on the CDS-4000 to industry-standard, 32-bit workstations, such as the Sun Microsystems, Inc. workstation that Computervision recently added to its product line. Second, convert all of Computervision's systems to an AT&T Unix environment. That way, the 32-bit workstation can be networked to the CDS-4000, which would act as the host system. The CDS-4000 and workstations can then be linked to the CDS-5000, where all the CAD/CAM-related data can be stored. In addition, this network can accommodate systems from other vendors, such as VAX computers from Digital Equipment Corp.

Neither phase is complete. In mid-1985, for instance, Computervision introduced a Unix-based network that would have linked its workstations to the CDS-4000. However, users had to purchase software that averaged $5,000 per workstation to access the CADDS software.

In a sense, it is a Band-Aid solution until CADDS is made fully compatible with the workstations.

The end result of the entire project is what Computervision calls Product Process Automation, a concept it has been promoting heavily since the inception of this project. The company sees a day when it can provide the entire CAD/CAM environment, from individual workstations to large data base management systems that take the product production process from the concept and design stage to manufacturing, documentation and service stage.

The emphasis of Product Process Automation will be software, since Computervision now says that hardware is secondary.

Take the IBM 4300-based CDS-5000. Baar said the company does not care if customers buy their mainframe from it or from IBM, which is a strange remark for an IBM value-added reseller to make. The only advantage to buying the entire system from Computervision is "one-stop shopping," he said. What is important is to buy Computervision's PDM software, of which an upgraded version, PDM II, was released in November.

Of course, critics would say this is the company's way of conceding that customers were never very interested in buying IBM hardware from Computervision in the first place.

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"The problem now is the speed and timing in making those [product] changes," said John Rohal, an analyst with Alex Brown and Sons in Baltimore. "The major issue is, how long can they keep customers feeling positive about these developments?"

Keenly aware of the need to get Product Process Automation on the market as quickly as possible, the company refocused its research and development division to pursue this goal. Before the slump, Computervision — which spent 11% of revenue on research and development in 1984 — could afford to tie up resources on pioneering-type projects, like software to help design artificial human body parts.

Such cutting-edge efforts were considered too costly. Throughout 1985, the company "reduced, eliminated or combined a whole variety" of development programs, Baar said.

Similarly, the marketing focus was narrowed. Instead of concentrating on growth in new customers, Computervision now sees it as more profitable to bring its total solution concept to its existing customer base.

Baar put it this way: "Today, we are looking at an array of CAD/CAM markets. You can no longer be the dominant company in CAD/CAM. We plan to focus on our core market." The company has "turned back to the heartland of CAD/CAM" instead of venturing into new areas, he said. That means focusing on the electromechanical market in which Computervision got its start and concentrating on the large user base it established in that area.

At the same time, if a customer were to approach Computervision with a project in a new area, the company would accept such a challenge. But, as Baar said, "No one in R&D is spending a lot of time developing new software for the medical world."

One indication of this marketing shift is the firm's attempt to beef up its service to customers with a separate division for that purpose. In the past, it had only been an offshoot of sales.

Getting lean and mean

The framework of the organization was also changed to suit the simpler focus. This entailed the "get lean and mean routine" that so many computer companies talked about in 1985. In addition to the layoffs, it closed facilities that were not full to capacity.

By the end of 1985, the company had shut down "about a half dozen facilities," including a manufacturing plant in Sanford, Maine, and two office facilities in California that it had been renting but had never occupied.

Another step is what Baar called the "elimination of unneeded assets." He would not provide specific details but said the company continues to sell off office equipment from "personal computers to sizable computers."

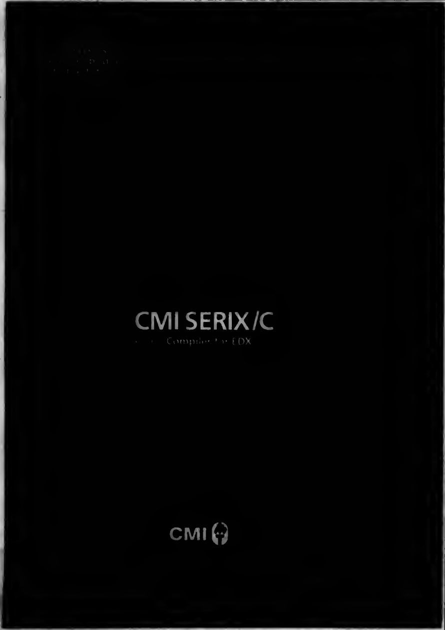
Other cost-cutting measures, such as an increased emphasis on accounts receivables and "making sure orders are orders," are also under way, Baar said.

Plans for early '86

In early 1986, the company will continue reorganizing and cutting back under Gable's command, Baar said. He would not discuss additional changes, however, until they actually take place.

Just how successful the "new" Computervision will be is unclear. If the the company stays on schedule, the product-transition project should be complete this year. But whatever ground IBM, Integraph and other vendors gain in the meantime could spell more trouble for the Bedford company.

"If Computervision isn't able to get back, it will damage the credibility of all the other vendors," according to Daratech's Foundyller. "If you buy a CAD system, you're tying your future to that vendor. If users see Computervision go down, they won't know who to trust anymore. Almost everybody is rooting for them." ■



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Software pricing strategies

Tough times bring independents to the table

By John Gallant

At this time of the rolling year, the usual party of pundits gathers to ponder how the software industry landscape will be reshaped by the shifting winds of the coming months. In foretelling the future of software technology, a great many predictions are likely to miss the mark. Such is the nature of conjecture.

One thing seems certain, however. Software prices will increase — significantly. On that matter, users, vendors and analysts fatalistically concur.

That software prices will rise does not necessarily mean users will pay more for all the software they purchase next year. Sluggish sales and stalled revenue growth in 1985 made independent software vendors even more willing than usual to "play ball," as one user put it, on pricing. Some users and observers characterized the final months of 1985 as a period of pricing frenzy during which vendors slashed list prices to seal much-needed sales.

If the fortunes of the independent players improve in 1986, the "give" in the customary give-and-take of price negotiations will probably not be so great. But if the software industry slowdown continues unabated or worsens, analysts contend, instances of price cutting may become more common, and the degree to which price tags are slashed may be more severe. The price cutting is likely to feed on itself as users become better informed and more aggressive in demanding price concessions.

ILLUSTRATION BY DAVE RIDLEY

All of this, however, ignores IBM, which has the most significant impact on the majority of users. As the dominant player in every segment of the large systems software market, IBM's pricing strategies are the music to which users must dance. Software continues to account for a larger portion of IBM's total revenue — and a significantly larger portion of its profits — and routine, significant price hikes are one of the tools IBM uses to ensure that software revenue continues to grow. IBM does not deal on pricing, users say. IBM does not have to, analysts remind.

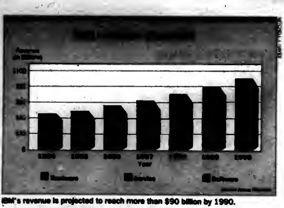
Beyond the immediate importance of IBM's pricing strategies to users of its software, observers agree that IBM sets the tone for pricing in the industry. There is an adage that says IBM is conditioning users to pay higher prices for software. Neither users nor vendors gainsay it.

Sluggish sales and stalled revenue growth in 1985 made independent software vendors even more willing than usual to "play ball" on pricing.

"For years, IBM has got people used to paying more and more for software," said Richard Biggs, senior vice-president/director of MIS at Provident Bank of Maryland. "Ever since IBM unbundled hardware and software, we have watched a steady increase in IBM software costs."

"IBM sets the trends we all follow," said Frank Dodge, president of McCormack & Dodge Corp., the Natick, Mass.-based applications vendor. "IBM is IBM. The rest of us are followers."

Dodge's comments were echoed by Dennis Yablonsky, president of Cincom Systems, Inc.,



IBM's revenue is projected to reach more than $90 billion by 1990.

an applications and data base management system vendor located in Cincinnati. "IBM is the base from which every company views itself. The higher IBM's prices are, the more we can charge, assuming that we maintain a quality differential. What IBM is doing, both in terms of how and how much it prices its software, is good for the industry."

According to Annex Research, a Phoenix-based computer industry research and consulting firm, IBM's 1984 software revenue was $3.2 billion, or roughly 7% of its total revenue. Software, however, accounted for nearly 8.5% of IBM's profits for the year, a figure that underscores the increasing strategic importance of software sales to the hardware giant.

"Therein, you see the importance of IBM's software prices," said Bob Djurdjevic, president of Annex Research. "Software is a product that provides a larger contribution to IBM's profit than it does to IBM's revenue. Therefore, it is an area of strategic future importance to IBM."

IBM software revenue in 1985

In 1985, according to Scott Smith, vice-president of Gartner Group, Inc., a Stamford, Conn.-based market research firm, IBM's software revenue was expected to increase by approximately 30% to more than $4.1 billion, slightly more than 8% of total revenue.

Although IBM's software revenue growth was 10% lower than in 1984, Smith said, IBM fared significantly better than the industry as a whole, which grew at roughly 23% in 1985. IBM benefited from its massive rental base, which provides a steady revenue stream that can be easily swelled by price increases.

Beyond its bottom-line importance, though, software is also the engine that drives hardware sales — a relationship that is not lost on the Armonk, N.Y., giant.

"The mistake comes in looking at IBM as a hardware company," Smith said. "Software represents only 8% of revenue today. But software is driving hardware sales, and IBM is increasingly realizing that."

Annex Research's Djurdjevic said users can expect IBM to apply a three-pronged strategy to price increases in the future. The tines of IBM's pricing strategy will include the following:

- Periodic upward adjustments based on what IBM calls "normal business review." Users weathered three such periodic adjustments in 1985. In February, IBM increased prices on most systems software by roughly 7%, and in October it upped prices on more than 1,100 applications and utility packages by an average of 10%. In November, prices on nearly 140 of IBM's almost 500 microcomputer packages were hiked between 8% and 30%. Djurdjevic said users should expect similar price adjustments in 1986.
- Major price increases accompanying releases of enhanced software products. Although such price hikes do not have the regularity of the periodic adjustments, their impact can be significant. According to Djurdjevic, the initial release of MVS/XA, announced in 1981, was nearly three times as expensive as the then-current release of MVS/SP. Other important products recently subject to such increases were the latest release of the IMS DBMS, with Extended Recovery Facility, and VM, with the introduction of VM/XA. Prices on both upgraded products were significantly higher than previous releases.

Were the price increases justified, considering the enhancements to the products?

"That is a very good question," Djurdjevic said. "A threefold increase in MVS pricing, for example, is something you would think users would not take lying down. I approached many users who had installed MVS/XA and asked them to assess the additional cost relative to the additional functions and benefits. Not one user had a concrete answer.

"All of them talked about the benefit of 31-bit addressing," he continued. "That was the IBM marketing

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pitch. It focused on the increase in addressable memory rather than the dollars-and-cents issue. But that is a systems programmer answer to an economic question. Users had undergone no concrete justification process as they would have with a hardware purchase. They justified the increased costs with a qualitative opinion rather than concrete facts."

■ Less easily discernible price hikes resulting from what Djurdjevic labeled new "creative pricing methods." One such method that analysts said will become more common across IBM software offerings is so-called "value pricing" or usage-based pricing. Rather than paying a fixed monthly or one-time fee, users will pay for software based on the number of terminal users or the number of transactions processed. Several IBM products have recently been subject to value pricing, including IX/370, IBM's version of AT&T Unix System V running as a guest under VM.

New accounting method

"This is a whole new method of accounting for software that will allow IBM to charge larger companies more because they use a package more than a smaller company," Djurdjevic said.

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>
> ***'When IBM controls a market, it really charges high prices.'***
>
> **— Martin Goetz**
> **Applied Data Research, Inc.**

Many independent software vendors said they are also in favor of value pricing, which, as a result, may become a more widespread practice in 1986. "Functional pricing is something we feel is appropriate, and we would like to see more of it," Cincom's Yablonsky said.

But value pricing is clearly a vendor-driven phenomenon — the majority of users are against it. "I have not yet run across value pricing, but I strongly object to it," Biggs said. "I really have a mental problem with it. It is just another way to hide price increases."

'Playing on user ignorance'

"Vendors are playing on user ignorance," said Glenn Lakowicz, director of MIS at Speidel Division of Textron, Inc. "They couldn't price their products up front to make the same amount of money. In the long run, users will be paying a hell of a lot more money than if they just bought the package outright."

Djurdjevic also predicted that next year IBM will offer a larger number of software products for one-time charges rather than monthly licenses. In October, IBM made 262 former monthly tariffed programs available for a one-time charge. Although the policy will give users who purchase products protection from future price hikes, IBM is the clear winner, he said.

"None of the packages that I have seen shifted to a one-time fee are the latest releases of IBM software," Djurdjevic said. "IBM has typically applied this policy to older versions, the products it is getting ready to discontinue in the foreseeable future. It is trying to maximize the cash it gets out of the package. IBM enjoys the benefit of a rental stream for a long period of time and than one, large balloon payment at the end."

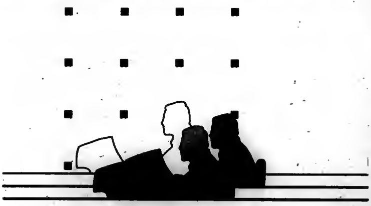
On the subject of which IBM products will be most significantly impacted by price hikes, there is little debate. Because IBM virtually owns the operating systems market and the related software market, users can expect to pay even higher prices there.

"When IBM controls a market, it really charges high prices," according to Martin Goetz, president of Applied Data Research, Inc. "Look at operating systems where IBM has a virtual monopoly. There you will see prices go really high, and users will really be hurt," Goetz said.

Even though IBM faces competition in the applications and DBMS markets, analysts said, it still has a powerful leg up on its Lilliputian contenders.

"You have to be careful to compare apples and apples," Djurdjevic said. "IBM can announce something new and unique, such as the [Extended Architecture] version of IMS, that other vendors have to respond to once it is shipped. Nobody else has the added capability, and that gives IBM the chance to price at a higher level. By the time the competition catches up, IBM may have come up with another feature at a higher price. It's a lot like the [plug-compatible manufacturer] market. IBM has a virtual monopoly because others have to follow it."

Damian Rinaldi, director of International Data Corp.'s Software and Services Information program, added, "IBM maintains a dominant position across the board in software. It may not be as dominant in all areas as it is in systems software, but it is, nonetheless, the most influential player." But where many see only revenue growth as the primary force behind IBM software price increases, Rinaldi attributed them to another important factor — increasing software development, support and maintenance costs. "On the one hand,



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IBM has to increase price; on the other, it has to come up with more products," he said. "The cost of developing products is staggering. IBM may drill 100 wells and only hit one gusher."

That more sympathetic overview of IBM's pricing moves is certainly the one IBM itself espouses. In a recent interview with *Computerworld*, Robert Berland, director of strategic planning for IBM Information Services, countered users' complaints that price increases did not necessarily go hand in hand with product enhancements.

"Our packages are continually under enhancement, continually being upgraded," Berland said. "Key products, the major strategic systems, have ongoing development teams, support, marketing and education efforts behind them. That is an incredibly expensive, people-intensive business."

■

Evidence of price slashing apparent

The relationship between IBM's software prices and the list price of independent vendor software is fairly steady. Users can expect the stated price of most large systems software packages to increase significantly next year for many of the same reasons IBM's prices will go up: the need for vendors to improve their bottom lines, the desire to test what the IBM-influenced market will bear and the rising cost of personnel and development, support, training and marketing efforts.

But as many users tell it, the list price of independent vendor software often bears little resemblance to the actual price at which it is sold. Some vendors vehemently deny that price cutting generally occurs, and it is difficult to get a handle on just how extensive the practice is.

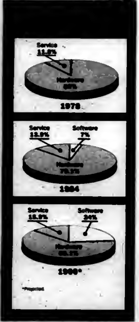
However, the weight of anecdotal evidence highlights the fact that price cutting is at work in the software market and that the level of slashing fluctuates with the state of the economy.

"A lot of hidden price flexibility becomes apparent when the crunch comes," said Damian Rinaldi, director of International Data Corp.'s (IDC) Software and Services Information program. "That is a fact of life. If vendors cannot be flexible on price, they'll throw in other packages to sweeten the deal."

Wheeling and dealing

"We were dealing with an applications vendor for a general ledger package for $125,000," said Glenn Lukowicz, director of MIS at the Speidel Division of Textron, Inc. "Then the vendor found out we were talking with a competitor. The vendor offered us a bundle of packages, including the general ledger, worth $200,000 for $110,000. We took the competitor's offer of three applications and micro-mainframe link software for $80,000. The competitor had originally offered us the general ledger alone for $80,000. Even at that point, we wondered if we could have done better."

Contrast Lukowicz's comments



Software should generate almost a quarter of IBM's revenue by 1990.

Outlooks '86

"In 1985, Ada came out of the research and development labs. It is finally being used in real and significant projects.

"The year 1986 will show refinements. The tools will be reworked to meet the needs of the developing market.

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with those of William Graves, president and chief operating officer of Management Science America, Inc. (MSA). "There is a real lack of understanding about price cutting. Most of the information people think they have is inaccurate.

"They don't understand what someone bought for the price, how much service, training and so on," he said. "We have taken a lot of heat on price cutting, and it is inaccurate and inappropriate.

"If we are guilty of price cutting," Graves continued, "we are one of the least guilty."

'Not all that frequent'

"Price cutting is not all that frequent," according to Martin Goetz, president of Applied Data Research, Inc. "It is an overblown issue. We have never taken the lead on price cutting, and I'd stand up in court and say that."

Cincom Systems, Inc.'s President Dennis Yablonksy concurred. "We try to set our prices aggressively. We sell the value of our products, and we just do not permit price cutting," he said.

According to McCormack & Dodge Corp.'s President Frank Dodge, however, "The discounting in 1985 was incredible. There has always been some discounting, but it used to be pretty much a year-end thing. Since our competitors went public and began to be rated on their quarterly performance, it became a quarterly thing. Now it is brutal."

Similar package for less

Dodge said that in a recent third site sale of a multiple-package suite, which M&D was offering for 50% of its list price. one of the company's better known competitors offered a similar suite of products for $80,000 less — about 35% of that vendor's list price.

"We go in at list price, and we try not to talk about discounting at all until we are the selected vendor. Then we negotiate," Dodge said.

"When we win, several of our competitors will try to lowball the client, offer $400,000 worth of products, say, for $175,000. The user will say, 'I think your products are better, M&D, but I cannot justify spending twice as much for them.' We might have to go to $325,000, and we will do it. It is just part of the game."

Price cuts have impact

Sometimes substantial price cuts have an impact quite different from that which was intended, users said. "Big price cuts definitely make me apprehensive," Lukowicz said.

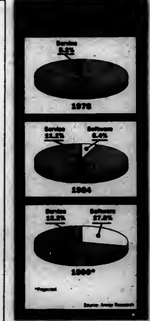
"You wonder why they are willing to take a supposed loss. The vendor also gets you wondering whether you couldn't push further, and it gets you psyched up for further decreases in the future," he said.

"When the price goes too low," IDC's Rinaldi said, "users assume that there is either something wrong with the product or that other buyers were being shafted all along. It isn't good business to cut aggressively over a long period of time."

Ignorant about prices

Vendors concur that users are relatively ignorant about which software companies cut and about what other users are paying for their products. That is a view users clearly do not share.

MITCHELL J. HAYES



Software is becoming more important to IBM's bottom line.

"Users are not really very knowledgeable," Yablonsky said. "There is really no place users can find out what others are paying or what a vendor is doing. I think users, though, are just assuming that everyone is cutting, and they are pressing all the vendors."

But Lukowicz claimed that users rely on vendor-supplied customer contacts who freely share price data and valuable bartering information about vendors. "It is in our own best interest to share that information," he said. "When one user gives you some help, he is hoping there will be someone there to help him in the future."

Users care little about price

And to hear it from vendors, users really care little about price. Quality is the key word, vendors said. Beyond that all else pales.

"People want to make sure you are selling them what they want. They are not worrying about pricing," according to MSA's Graves. "A good user will try to negotiate, but price is not the top-of-the-list item."

But Olin Mills, Inc.'s systems programming and data base/data communications administrator, Pete Clark, contends that price is a critical factor in purchase decisions.

"Yes, pricing is important. We have always been price aggressive, and I see other users become just as aggressive," Clark said. "It is common knowledge that list price doesn't necessarily hold."

Unfortunately for vendors, price cutting also seems to feed on itself. "We have been feeding on price cutting for years," Lukowicz said. "The anticipation is there, we count on it. If we cannot negotiate with a firm, it is not even considered."

"Price cutting starts out vendor driven," Yablonsky said. "But in the last six months, we have started to see customers asking for deals who a year ago wouldn't have even considered pushing for special treatment. This is a problem. Once it starts, it feeds on itself. All the customers start to feel that they should get special terms."

Added training or support

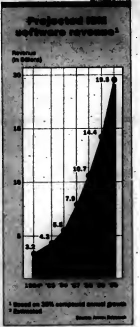
One thing even vendors admit is that they routinely assuage price-aggressive users with offers of added training or support. Yablonsky said the only thing Cincom will deal on is additional support or education days. Goetz said ADR also uses such bargaining chips.

How much of an impact price cutting will have next year ultimately depends on the state of the economy in general and the software industry in particular. If price cutting becomes more rampant, some vendors could be hurt, Rinaldi said.

"I think you will find that the companies that are part of larger organizations will be able to survive the cutthroat behavior for a longer period than your two corner gas stations nickle and diming each other to death," he said.

— John Gallant

MITCHELL J. HAYES



¹ Based on 35% compound annual growth
² Estimated
Source: [illegible]

IBM's revenue from sales of software is forecast to reach $19.5 billion by 1990.

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AT&T goes to market

First you walk, then you run

By Charles Babcock

The scene was AT&T's value-added reseller council meeting last fall in Morristown, N.J., and the speaker was a newly recruited AT&T value-added reseller, James Jacobson of Jacore Systems.

His customers were clamoring for a minicomputer line with which they could grow, according to the chairman of the Marietta, Ga., firm. They needed something that would allow them to take their software with them as they moved up to more powerful processors.

AT&T's 3B line, with its Unix System V operating system. and wide range of performance, offered precisely that option, he said.

Some observers question how valuable the mid-range market is, squeezed as it is by supermicros on the bottom and by lower cost mainframes on the top. But for now it appears to be the only market that is open to a new vendor and still growing, and AT&T is pursuing it for all it is worth.

Furthermore, the competition from IBM is a mixed bag — the System/36, System/38, the Series/1 and the 8100 distributed processor — all of which are incompatible with each other and the low end of the IBM 4300 mainframe series line.

Jacore is sensitive to the compatibility problem because it makes the bulk of its $60 million in revenue selling IBM System/36 packages. Before it became one of AT&T's value-added resellers, it was — and still is — IBM's largest reseller, one of the 10 that IBM recruited in 1982 when it first started using the third-party distribution channel.

"We are delighted to add the 3B line to our business," Jacobson said. He said he thinks it offers a better price/performance ratio than the System/36 and that it answers his customers' need for a migration path.

Jacobson said Jacore is not alone in seeing the advantages of the AT&T line.

Value-added resellers are independent businesses that supplement a vendor's direct sales force by reaching smaller, scattered customers that a highly trained account executive is likely to miss. Their typical sale is a $90,000 system with custom features built into it. Analysts said these resellers are the dominant sales force in the mid-range, small business and departmental computer market, and the vendor that makes the best use of them will show the greatest gain in that market. "Having highly reputable [value-added resellers] is of prime importance to us," said Alan L. Mendelson, AT&T Information Systems' computer division vice-president in charge of resellers.

For now, the mid-range market appears to be the only one open to a new vendor, and AT&T is pursuing it for all it is worth.

"I think going after the value-added resellers is the right thing. It's their best opportunity. But they better hurry," said James W. Meyer, who follows AT&T as codirector of research at Janney Montgomery Scott, Inc., a Philadelphia brokerage house.

The mid-range market includes businesses with 1,000 or fewer employees, departments of large corporations, the government and other institutions. Despite the slowdown in sales elsewhere, the mid-range market contin-

ILLUSTRATION BY MARC TAFFET

FORECAST

ues to grow and represents potential sales of $9.8 billion in 1986, according to Infocorp, the Cupertino, Calif., market research firm. The larger share of that market, $5.3 billion, is expected to be derived from departmental buyers, while small businesses with $5 million to $50 million in revenue will account for $4.5 billion, Infocorp spokesmen said.

"I don't think these people are committed to any particular vendor," Meyer said.

"IBM has essentially left that market wide open," said Molly Upton, editor of International Data Corp.'s (IDC) newsletter on office automation.

"This is where AT&T and IBM will fight it out head to head," predicted C. Noel Wadsworth, president of Jacore.

But winning that fight remains a challenge.

Until late last year, AT&T was unable to play to its strengths in the communications field, a major concern of the departmental computer buyer who is often bracketed by IBM mainframes and micros. Since 1983, AT&T has been restrained by the Second Computer Inquiry, in which the Federal Communications Commission ruled that the operations of AT&T Information Systems, the equipment subsidiary, had to be kept separate from AT&T Communications, the long-distance service unit.

Significant provisions of Computer Decision II were waived in September, and since then, AT&T has had the option of having one salesman or one team offer both communications and computer products to the same customer.

AT&T's 4,000-person direct sales force has been busy knocking on the doors of the Fortune 1,000 companies; but regardless of whether they are talking to large customers or small, the salesmen of AT&T equipment still face the problem of a limited selection of software.

Unix applications increasing

AT&T is striving to bring more Unix applications to market, frequently through alliances with small C-writing software houses, and the number of applications is rapidly increasing, spokesmen for both AT&T and independent observers said. By mid-1986, the 500 programs listed in AT&T's software guide should triple to 1,500, said Curtis A. Weeks, director of applications software for the Computer Systems Division.

If AT&T is to compete with the formidable library of software for IBM machines, it is going to have to convince potential 3B users that independent software houses are developing applications. And to do that, it needs an installed base of machines, according to Kenneth M. Leon, securities analyst with L. F. Rothschild, Unterberg Towbin in New York.

Which brings many observers back to the value-added resellers. "Given the constraints of Computer Decision II on them in 1985, concentrating on the value-added resellers was a real smart move," IDC's Upton said. The resellers, with their ability to write software and customize systems, could address both computing and communications problems.

George F. Colony, president of Forrester Research, Inc. in Cambridge, Mass., said he expects AT&T to move more hardware through resellers in 1986 than it did in 1985. Sales of 3B totaled $800 million in 1985, compared with $100 million in 1984, he estimated. About 30% of them came from value-added resellers, he said. In 1986, he figured, 40% to 50% of the total will come from resellers. "AT&T will give up direct sales to value-added resellers to get more application software out there," he said.

In pursuing resellers, AT&T has an unwitting ally in IBM, Jacore spokesmen claimed.

A reseller for IBM must seek approval from a review board for each new system it wishes to sell. The approval procedure can take "months and months. It's very formal," said Wadsworth, who also claimed that Jacore lost sales while waiting for approvals.

"They approve one thing one time and not another. They approve a system for sale by one company and not another. It's strange," he said.

Jacore Chairman Jacobson said that IBM has only used the value-added reseller channel for three years and blames some of the problems on inexperience. But Wadsworth attributed the difficulty to "IBM's plantation mentality," where it insists it is the master of its business and where outsiders are relegated to a servile status.

"They have been dominant for so long, they don't know how to do anything different. AT&T can watch what IBM does and do the opposite," he said.

Regardless of whether it is complaints about IBM or the attractiveness of the 3B, value-added resellers have been flocking to AT&T. At the start of 1985, Mendelson took charge of the reseller sign-up by weeding out 13 of AT&T's 40 existing value-added resellers. Mendelson said he did the trimming because he wanted to establish a group that could provide after-sales support as well as push hardware/software packages.

Since then, the numbers have mushroomed in the opposite direction. AT&T now counts 125 primary resellers, each doing over $1 million annually in sales, and 550 indirect resellers, which provide components of AT&T systems and act as distributors of hardware to smaller companies doing less than $1 million a year in business.

One of its biggest catches was VMark Computer of Natick, Mass. VMark officials recently shared the podium with Computer Systems Division President James D. Edwards to say they will offer a data base management system to Pick Systems' Pick operating system resellers. With it, applications designed to run under Pick can be used on Unix systems, adding a potential 3,000 applications to the available Unix library.

> **''It's perfectly viable now to have Big Blue at the top, some other color at the departmental level and IBM PCs at the bottom.'**
>
> — Molly Upton
> International Data Corp.

Brokerage analyst Leon said AT&T is still in "the honeymoon stage" with its value-added resellers and that it is too early to say whether its ardent courtship will pay off. But he said pushing the 3B line for "departmental networking and communications is a strategy that plays to AT&T's strengths."

In 1985, AT&T appeared to change its strategy quietly in that direction. Instead of hyping Unix as an operating system to compete with IBM systems, it began talking about its potential as a multiuser, departmental interface.

The change of emphasis recognized that the commercial marketplace is dominated by IBM mainframes and operating systems at the top and either IBM PC-DOS or Microsoft Corp. MS-DOS compatibles at the bottom. If Unix has a future in the commercial market, it will have to squeeze somewhere in between the two. AT&T also sought to illustrate that it could fit into the IBM world and offer something extra, with such products as the 6500 Multifunction Communications System, an IBM 3270-compatible that could talk to various mainframes.

"It's perfectly viable now to have Big Blue at the top, some other color at the departmental level and IBM PCs at the bottom," Upton said. If shared in the marketplace, that perception does nothing to hurt AT&T's computer products.

Colony termed 1985 a watershed year for AT&T because it succeeded in getting Unix System V established as a standard. At times, the effort took on the air of AT&T furiously trying to recapture something that it invented, as small OEMs continued to push their own versions of Unix.

AT&T finally seemed to get the runaway back into the corral when it announced it would work with Sun Microsystems, Inc. to enhance Sun's University of California at Berkeley Unix Version 4.2. The joint effort will result in 4.2 being made compatible with System V, thus neutralizing the competition between the two.

In another milestone decision, six European manufacturers said they would adopt System V as their standard. And Intel Corp. said it would port System V to its new 80386 microprocessor, ensuring that Unix will appear on a host of new products.

AT&T still finds itself without a mainframe offering, and it is unclear whether it will seek a joint marketing agreement with a mainframe vendor such as National Advanced Systems Corp. or Amdahl Corp. If anything, IBM's hold on the mainframe market appears more seamless among commercial users than it did when AT&T announced its 3B line in March 1984.

"It's just very difficult for them there," said Archie McGill, former president of the Advanced Information Systems division of American Bell, the forerunner to AT&T Information Systems prior to the breakup. "I think you better make your way in the minicomputer market before you try to go into mainframes," he said.

However, AT&T in 1985 did announce it will sell a Unix mainframe operating system developed by Amdahl.

AT&T's microcomputers, the IBM-compatible PC 6300 and dual Unix/MS-DOS PC 6300 Plus, were some of the success stories of 1985, Colony said. AT&T sold an estimated 170,000 units, mostly through retail outlets, compared with 15,000 to 20,000 the year before. The performance placed it fourth among microcomputer sellers, behind IBM, Apple Computer Inc. and Compaq Computer Corp. But its Unix PC continued to be a slow seller, according to Colony. AT&T said sales of the machine give it 6% of the desktop market.

But the microcomputers are moving at low prices and many analysts question how much profit AT&T is realizing from them. Its future lies in establishing its mid-range line, and IBM's recent pricing moves foretell keen competition ahead. The entry model of an IBM System/36 that can support three users and a printer is $10,000 with the high-end System/36-5362 available for $21,000. ■

Outlooks '86

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Micro management

Learning to handle end-user computing demands

By Peggy Watt

The microcomputer is no longer a stranger at the corporate office. But even as corporations are accepting and encouraging the use of micros, they are becoming more structured about how that will be done.

Corporations are adopting firm policies for micro purchase and use, spelling out procedure for procurement, applications, user responsibilities and software distribution.

"Before we had a policy, it was kind of computermania; do your own thing," said Larry Dorf, senior vice-president of Security Pacific Automation Co., a subsidiary of Security Pacific National Bank in Los Angeles.

Now, he said, the bank has a 1½-year-old policy stating that the institution "encourages and supports the use of personal computers throughout the organization when it is justified through increased productivity or when there is reasonable assurance that it will be more effective than other means."

Senior management was at the top of the list to get personal computers at Security Pacific, Dorf said, and President and Chief Executive Officer George F. Moody got the organization's first personal computer a little more than a year ago. Since then, 90% of the company's executive vice-presidents have been introduced to personal computing, and a number of senior vice-presidents sit on the information center's steering committee.

"What we were really doing was getting the right mind-set out there," Dorf said. "If a vice-president's subordinate came up with a good business suggestion that required buying a personal computer, the vice-president would know what the subordinate was talking about."

ILLUSTRATION BY ROB SAUNDERS

The bank also reviews its policy periodically. "It's just a sign of the immaturity of the PC market as opposed to the mainframe world that this policy is still being worked out," Dorf said.

Like most companies, the bank's strongest controls involve acquisition, for consistency of equipment in use, and the harnessing of impulse purchases that may turn out to be less than useful, Dorf said.

"But with too much control, you can stifle people with standards and put a hold on innovation," he added.

Most managers said the micro enthusiasts in their companies are rarely short on innovative uses for the new equipment and, in fact, must sometimes be reined in.

Most managers said the micro enthusiasts in their companies are rarely short on innovative uses for the new equipment and must sometimes be reined in.

Policy setting is "a very laborious task in most corporations," according to James T. Fortney, manager of systems planning for Litton Data Systems, a division of Litton Systems, Inc. in Los Angeles. Management also has the chore of choosing standards that are still being set in the industry and deciding who should really be the personal computer users in the firm "whose job is to get work done, not to learn to use computers," he said.

McDonnell Douglas Aerospace Information Services Co.'s policy is "an attempt to make anarchists unite," according to Richard Nelson, senior section manager, in a gentle prod at technozealots who are so excited about new technologies that they forget the purpose of the machines is to improve productivity and not just to find new ways of doing things.

McDonnell Douglas, of Long Beach, Calif., drew up its policy two years ago, recognizing that "personal computers belonged in the total picture of office automation," Nelson said.

"Office automation and personal computing are linked and ought to be supported by the same organization," he added. For example, a deluge of microcomputers to a given division is likely to be followed six months later with a request for extensive cabling, he said. Now, most of McDonnell Douglas' personal computers are connected to mainframes.

> **'You can stifle people with standards.'**
>
> — Larry Dorf
> Security Pacific Automation

The company boasts some 5,800 IBM-compatible microcomputers companywide for its 90,000 employees. Its aircraft division plans to ease into a one-to-one ratio of employees to workstations, be they personal computers or intelligent terminals.

Nelson said standardization has helped the company get bulk discounts, and he encourages employees to share their skills.

"But we don't try to solve every individual need," he added. "Some things are specialized, and individual departments can do them."

At Arco Petroleum Co., a Los Angeles subsidiary of Atlantic Richfield Co., software already on the approved list is easiest to get, but other acquisitions are not impossible, said Bert Jablinski, division manager.

Certain vendors are favored for their volume discounts, he added. And under the firm's first microcomputer policy, published in mid-1982, any personal computer purchase needs approval from a vice-president.

Arco organized its end-user computing division after a 1981 presidential memo expressing concern over the "rapid, unchecked growth of computers in all areas of the company," Jablinski added. He said Arco was concerned that the "right" equipment was purchased and that growth would not overrun budget.

Pacific Gas & Electric Co. (PG&E), San Francisco, which considers itself a pioneer in integrating micros into the company ranks, is nevertheless still waiting to hear industry verdicts on some automation standards.

"As far as a general local-area network, we're waiting," said Thomas J. Buckholtz, office technology project coordinator. Rather, micro-mainframe communications are more critical because budgets are being designed on micros with data downloaded from mainframes and then uploaded again. Micro-mainframe connections are "even more practical than local-area networks," he said. Micro-micro communications are not urgent because "you can always carry a diskette down the hall."

Some 2,000 microcomputers have sprung up in PG&E offices across its 94,000-sq-mile territory in the past three years, Buckholtz said. They handle chores as ordinary as office functions and as unique as enabling meter readers to dump data entered in hand-held calculator-like systems into the main office data banks.

Its 6-year-old policy "captured early something that other people are trying to catch up with now," he said. Its principles include the pledges to meet the needs of the company — be they memo production or engineering computations, to encourage user-friendliness by "placing tools in the workplace that keep people at their work and do not distract them," to keep its users as self-sufficient as possible through peer coordinators and standardization and to introduce technology where it fits well and when appropriate.

PG&E also claims to be the pioneer of microcomputer site licensing after signing its first license in 1983; it now has eight such contracts, Buckholtz said.

"If we had not done it, we would have far fewer computers and would be rationing software," he said. Both customer and manufacturer benefit from site licensing, and "it's much easier to equip systems because the software is standard." Still, he added, PG&E will "occasionally buy an off-the-shelf package" when there is a request for very specific applications.

Santa Rosa, Calif., city DP manager Bob Amiral said he has seen similar situations in the public sector.

"Cities seem to fall in one of two categories," Amiral said. "Either they're like us, with controlled data processing selection, or decentralized, with people doing their own thing with their own systems and their own programmers in their own divisions or departments. On one hand, the people uncontrolled are in the heat of things, taking advantage of the latest technology, but I don't think it's cost-effective a lot of the time."

He, too, has allowed individual departments with unique needs to acquire very specific systems, such as an Apple Computer, Inc. Apple IIe for measuring sewage flow, a Kaypro Corp. Kaypro for helping program the sewage treatment plant and a Digital Equipment Corp. Rainbow for handling financial data processing.

But for continuity, the bulk of the systems the city expects to buy in the next year will be compatible with each other. A variety of Compaq Computer Corp. desktops and portables are the chosen hardware; Lotus Development Corp.'s Symphony will be one of the software programs of choice, Amiral said.

The city's philosophy has been to prioritize requests, determine the appropriate hardware and software, decide whether to buy programs or develop them and "try to stay as standard as possible," Amiral said.

"I think it was astute on the part of city government to take its time. You hear about a lot of people with micros on their desks they're not using or employees writing their own package, getting the department dependent on it then leaving."

Other managers observe that microcomputing productivity is contagious.

"People are very creative, and it feeds on itself," said Timothy Turnpaugh, senior vice-president of Seafirst Bank's technology division. Turnpaugh has overseen the Seattle company's placement of nearly 1,000 Apple Macintoshes throughout its statewide sites.

> **'Personal computers belong in the total picture of office automation.'**
>
> — Richard Nelson
> McDonnell Douglas
> Aerospace

Users initially received the same software: the Macwrite and Macpaint programs bundled with the computer. As department users became acquainted with the system's capabilities, they developed applications suited to their needs. Turnpaugh called one department's Multiplan price analysis system "strictly homegrown" but a good example of the creativity he hoped the microcomputer infusion would provoke.

"The people who had a problem got their hands on the technology and applied the technology to the problem," he said.

Seafirst's Macintoshes are connected through its IBM System 3084 for electronic mail, but they are also all being boosted to 512K bytes of memory to enhance stand-alone use. Turnpaugh said he expects local-area networks will be the next boost, instead of hard disks.

"The problem with individual hard disks is that backup is unfamiliar to novice users; security and data management must be maintained," he said. "We have a handful of hard disks for special-needs cases and specific applications.

"I think the way the world is going is it's going to be a blend."

However, networks will bring "a lot of issues to resolve," including those of copy protection, McDonnell Douglas' Nelson said. "There are benefits to localized processing at different levels and for data storage at different levels," he said.

Local-area networks are also the focus of the five-year plan at Logicon, Inc. said Gus Tepper of the firm's Strategic and Information Systems division. Now the ratio is about one personal computer for every six employees, with the micros mostly used for word processing and other secretarial activities. The personal computers sometimes are used to emulate the IBM 3270 Personal Computer, but linking the micros themselves is the goal, he said.

Security Pacific considers communications between micros and mainframes and even established minicomputer systems necessary, said Jim Smith, president of the bank's information processing subsidiary, Security Pacific Computer Solutions, Inc. He said 90% of the institution's 3,000 personal computers have the capability of emulating an IBM 3270 terminal for interaction.

But the bank has not yet embraced local-area networks, Smith said. "We always ask, 'What are you going to move around on them?' "

Pacific Bell Telephone Co. is looking further into the future than ever, according to Jack P. Garrett, information systems district manager. He said a new San Ramon, Calif., office complex will include 6,000 or more workstations for some 7,200 employees who will be housed there. Each workstation will include a telephone-grade twisted-pair wire, five data-grade wires, two 75-ohms coaxial cables and fiber-optic ducting.

"You can't tell today what technology will bring tomorrow," he said. "The intention is to provide as much potential for each workstation as possible." ■

Outlooks '86

"The IBM AT was introduced in August 1984, and immediately the race was on to see who could make the first AT-compatible. Surprisingly, it took [illegible] months until the first — [illegible] Corp. — started shipping. [illegible] nearly all of the major [illegible] announced [illegible]

"The AT's [illegible]

[illegible]

Straight talk about software companies.

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It is this emphasis on customer requirements and satisfaction that has resulted—year after year, in survey after survey—in Cullinet's top ranking in the categories of vendor support, documentation, training, and overall user satisfaction.

We have built an uncommon loyalty among our users because they understand that we truly care about them. It's that simple.

John J. Cullinane
Chairman of the Board

These are five of the reasons why Cullinet is the leader and most respected company in the computer software industry.

1. Number One in Industry Sales

INDEPENDENT SOFTWARE VENDORS Software News' Top 50 Independent Software Vendors	
CULLINET SOFTWARE, Westwood, MA	$144,000
LOTUS DEVELOPMENT CORP., Cambridge, MA	140,000
MICROSOFT, Bellevue, WA	125,000
MANAGEMENT SCIENCE AMERICA (MSA), Atlanta, GA	120,000
APPLIED DATA RESEARCH INC. (ADR), Princeton, NJ	90,000
COMPUTER ASSOCIATES INTERNATIONAL (CAI), Jericho, NY	81,000
INFORMATION GENERAL, Woodland Hills, CA	74,000
DUN & BRADSTREET (D&B), Wilton, CT	70,000
UCCEL CORP., Dallas, TX	68,000
1984 U.S. Revenues ($000)	

While Cullinet never expected or sought to become the largest software company in the world, it still is a significant accomplishment.

Source: Software News

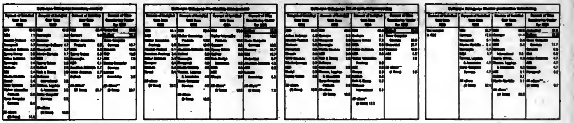
2. Number One in DBMS Sales

Intentions to Buy DBMS	1983	1984	1985 (YTD)
CULLINET	173	206	148
IBM (IMS)	147	180	79
ADR	76	130	64
IBM (DB2)	2	47	50
IBM (DL/I)	158	140	49
IBM (SQL)	81	110	48
SAG	91	100	46
CINCOM	38	72	17
CCA	17	21	11

Buying preference for IDMS/R is increasing because as more buyers become more knowledgeable in database technology, they recognize the technical advantages of IDMS/R over competing products.

Source: Computer Intelligence Corporation

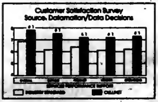
3. Number One in Manufacturing Applications



Source: Software News

Buyer surveys show convincing proof that Cullinet's 4th Generation manufacturing applications are the way of the future.

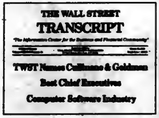
4. Number One in User Satisfaction



When it comes to vendor support, Cullinet is rated Number One year after year in every category.

Source: Datamation/Data Decisions

5. Number One in Management



THE WALL STREET

TRANSCRIPT

TWST Names Cullinane & Goldman

Best Chief Executives

Computer Software Industry

Cullinet management has been consistently singled out by the computer and financial industries as the best. John Cullinane, Cullinet chairman, was named CEO of the Year in 1982 and Co-CEO of the Year sharing honors with Cullinet president Robert Goldman in 1984 and 1985.

Source: The Wall Street Transcript

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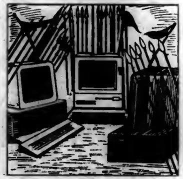
Trade wars



U.S., Japan and Europe man the tariff barricades

By Edward Warner

U.S. electronics firms are beginning to wonder whether international trade, once their golden goose, has become a carrion bird circling overhead. At home, their market share has been steadily eroded by less expensive, foreign-made products, particularly semiconductors and telecommunications equipment. Abroad, the U.S. manufacturers find their sales efforts stymied by state-run, foreign telecommunications monopolies and a thicket of regulations.

In 1985, with the U.S. trade deficit standing at $150 billion, $8 billion of it reportedly in electronics alone, the U.S. electronics industry cried foul. On the home front, the Semiconductor Industry Association (SIA) took Japanese semiconductor makers before a U.S. trade oversight agency and charged them with predatory pricing. On the foreign marketing battlefield, the Computer and Business Equipment Manufacturers Association (CBEMA) lent its support to legislation that would impose U.S. trade restrictions unless foreign telecommunications markets are opened.

"Home front." "Foreign marketing battle." These terms fit when applied to a dry topic like foreign trade because these trade battles are the economic equivalent of war. The losers have their casualties — the unemployed, the boarded-up storefronts; and the winners have their booming economies or protected industries. But, like any war in a world of intertwined relationships, it is hard to keep a trade war small. When the U.S. imposed the Smoot-Hawley Tariffs of 1930, worldwide retaliation resulted, and U.S. exports were reduced by three quarters — all at the start of the Depression. To restrain trade, it seems, is to invite retaliation and to set a forest fire when all one had wanted to do was light a match.

The potential for worldwide retaliation is what most worries the electronics industry, a field of business perhaps more international in its scope than any other. Digital Equipment Corp., for example, earns from 35% to 40% of its income from its foreign operations. Other U.S. firms, such as Atari Corp., conduct most of their manufacturing overseas; and still others, such as the numerous makers of personal computer expansion boards, rely on the same inexpensive Japanese memory chips the SIA decried.

To restrain trade, it seems, is to invite retaliation and to set a forest fire when all one had wanted to do was light a match.

And so it has come to be that only the hardest hit sectors of the electronics industry — telecommunications products and semiconductors — strongly support trade restrictions. But telecommunications and semiconductors are the very underpinnings of the industry, and changes in trading rules there will force changes industrywide.

Such changes are already afoot. Congress, under pressure from aggrieved industries and out-of-work constituents, is now considering a raft of trade restriction bills, most focusing on specific industries such as shoes or telecommunications. The industry-specific bills are said to have the greatest likelihood of passage because they represent what their proponents call a fine-tuning of trade law rather than a

ILLUSTRATION BY MARC TAFFET

revision.

Among the industry-specific bills that affect the electronics industry, the two that have the best chance for passage are in the U.S. House of Representatives, and both deal with with telecommunications, a trade segment in which the U.S. has reportedly plunged from a 1980 surplus of $1 billion to a 1984 deficit of $600 million.

One of the bills, introduced by Robert Matsui (D-Calif.), would require the U.S. trade representative, a U.S. Department of Commerce official who oversees trade matters, to spend six months assessing which of the U.S.' telecommunications trading partners have barriers against U.S. telecommunications products. The trade representative's report would go to the president, who would use the threat of tariffs and other presidentially imposed sanctions to negotiate an improved trading position with each offending nation. To speed approval in both chambers, the Matsui bill has a Senate counterpart, introduced by Sen. John Danforth (R-Mo.).

The Wirth/Florio bill

The other bill, introduced by Rep. Timothy Wirth (D-Colo.) and Rep. James Florio (D-N.J.), would also require the Commerce Department to conduct a six-month investigation of foreign trade inequities and place the negotiating and sanction-setting power in the hands of the president. But the Wirth/Florio bill, which is supported by the U.S. Chamber of Commerce, differs from the Matsui bill by giving the president more time to negotiate with an offending trading partner before he must set sanctions, said Bailey Spencer, an aide to Wirth on the House Subcommittee on Telecommunication, Consumer Protection and Finance.

The Wirth/Florio bill also differs in its inclusion of telecommunications services and in the means by which offending nations are identified, Spencer said. The Wirth/Florio bill, he added, has "no presumption up front that any country is acting in a manner that is unfair." The Matsui-/Danforth bill, Spencer charged, is specifically targeted at Japan.

The Matsui bill, however, has the support of the CBEMA because the bill covers the sales of foreign affiliates of U.S. firms, and the Wirth-/Florio legislation does not, explained CBEMA Vice-President Ted Heydinger. In any case, CBEMA's support may only be lukewarm. In August, the organization announced that it was "firmly opposed to current efforts to develop new trade barriers around U.S. borders."

In late November, the Wirth/-Florio bill was reported out of committee, and a House floor vote could come as early as January 1986. The Matsui bill, meanwhile, was still in committee.

While the U.S. telecommunications industry is pressing its battle for protection in the halls of Congress, the U.S. semiconductor industry is pleading its case before U.S. trade representative Clayton Yeutter, whose office oversees the administration of U.S. trade laws. In June, the SIA brought a complaint to the trade representative charging the Japanese semiconductor manufacturers with dumping their products below cost in the U.S. market. As evidence, the SIA submitted an analysis of the U.S. and Japanese chip markets — two sectors where it is losing ground — and a "smoking gun" memo, in which Hitachi Ltd. sales representatives were told to price their semiconductors 10% below whatever price the U.S. makers offer.

Action on the SIA's complaint appears likely in early 1986 due to the 1986 decision by the trade representative's office to impose deadlines in long-standing trade complaints. The deadline requires the parties to work out an agreement before a set date. If no agreement is reached, the trade representative's office can set trade restrictions against the foreign product.

Given the choice of legislative action or case-by-case sanctions imposed by the Commerce Department under existing law, the Reagan administration prefers the latter. With support in Congress building for some sort of trade bill, Reagan — long a vocal supporter of free trade — initiated in August his own investigation of Japan, Taiwan and Brazil. The investigation of Japan does not concern electronics, but the investigation of Brazil does, focusing on alleged Brasilian restrictions on the importation of foreign-made computers.

Should the Reagan administration either force changes in the Brazilian import rules or impose retaliatory action, it will have taken some of the wind out of the protectionists' sails.

While the lawmakers and regulators wrangle over which, if any, restriction to impose, the best hope for improvement arose recently from outside governmental circles. The dollar is declining on the international money market, particularly against the Japanese yen. The weakening of the dollar against the yen means that more dollars will be required to buy Japanese products.

The weakening of the dollar also means that U.S. goods will be less expensive to foreign buyers. A weak dollar will make U.S. products, including telecommunications equipment, attractive to the Japanese, with whom we have our greatest trade deficit. If the yen stabilizes at 200 per dollar and West Germany's deutsche mark stabilizes at 2.4 per dollar, and comparable drops in other world currencies occur, the U.S. trade deficit will eventually fall to $50 billion, according to Rimmer de Vries, a senior vice-president at Morgan Guaranty Trust Co. in New York.

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Europe wary of U.S. restrictions

By Amiel Kornel
Computerworld News Service

PARIS — European government and business officials view with growing alarm U.S. efforts to wield trade restrictions as weapons of economic and diplomatic policy. But economic realities and fragmentation of the European market oblige them to act with reserve in calling for retaliation.

"Europe can afford a trade war only if it succeeds in integrating its internal market," said Ra'f Garenc, information technology consultant at the Organization for Economic Cooperation and Development (OECD). "Under current conditions, European industry cannot afford U.S. retaliation," he said.

Because development and marketing technologies have proven to be so costly, national markets in Europe are too small to support competitive industries. As long as a unified European market remains a chimera, each country turns to the U.S. in search of a large market for its goods.

Europe's six main manufacturing nations — the UK, France, West Germany, Italy, Sweden and the Netherlands — have found that their exports of information technology equipment are growing at a faster rate than their domestic markets for such equipment. Computer equipment accounted for 40% of the $28 billion worth of electronic products exported by the European community last year, according to the OECD.

While the European economic community (EEC) says it is seeking out and removing trade barriers, protectionist sentiment appears to be gaining momentum in Europe. One of the European vendor's major complaints is with the subsidies given by some of their governments to the foreign firms that open plants or offices in their nation. European business is calling for a reduction in those subsidies because they direct money into the pockets of their competitors.

The protectionist fever is being fueled by Europe's $500 million trade gap with Japan, and EEC foreign ministers have asked Japan to increase importation of EEC goods.

Harsh economic realities, however, are dampening European protectionism attempts. Though the European community is hoping to unify the European market, it appears likely that, at least for now, Europe will continue to look abroad for trading partners before looking in its own backyard. ■

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THE BEST PART

U.S. and Japan wrangle on trade

By Takehiko Kondoh
Computerworld News Service

TOKYO — High-tech discord runs deep between the U.S. and Japan, a situation eloquently illustrated by the lack of progress in U.S.-Japanese semiconductor trade talks late in 1985. During the two-day Tokyo meeting, U.S. and Japanese government officials agreed only in principle to defuse the semiconductor trade squabble.

While the two sides agreed to adopt what one called "a pragmatic approach" to settling the conflict, they remained divided over how to give U.S. semiconductor makers increased market access to Japan and over ways to develop "a long-term and cooperative relationship" between the two industrial powers.

The Japanese government, meanwhile, is worried that the semiconductor dispute will come to escalate into a trade dispute comparable to those that beset Japan's mighty telecommunications, computer peripherals, medical equipment and lumber products industries.

Hoping to assuage the trade friction, the government's Ministry of International Trade and Industry (MITI) has proposed minimum price ranges be set for Japanese chips entering the U.S. market. MITI also has reportedly sounded out Washington, D.C., on industrial cooperation between Japanese and U.S. chip makers to develop jointly 1M-bit memory and other next-generation chips.

The Japanese government has also offered to abolish tariffs on imported computers and peripheral equipment, beginning in April. The Japanese computer industry had opposed the proposal, claiming that Japan suffers a deficit in computer sales to the U.S. About $390 million worth of Japanese computers were shipped to the U.S. last year, while the U.S. delivery to Japan totaled $424 million.

Throughout last fall's trade talks between Washington, D.C., and Tokyo, U.S. negotiators claimed that U.S. semiconductor firms have only an 11% share of the U.S. market, while the Japanese have 17%.

Japanese government leaders and electronics trade officials, meanwhile, claim that no institutional barriers against U.S. chip vendors exist in Japan and that Japanese chip makers have been falsely accused. Said one MITI official, "The Americans are framing us."

Japan's Prime Minister Yasuhiro Nakasone is expected to make concessions within the year as the Japanese government seeks an end to the semiconductor dispute. Nakasone said, "As a country preserving free trade, Japan should be active not only to sell to foreigners but also to buy from them." ■

Kornel is Paris hub bureau chief and Kondoh is Tokyo bureau chief for the Computerworld News Service.

Manufacturing Automation Protocol

GM test-drives a shop floor standard

By Paul Korzeniowski

Faced with formidable competition at home and abroad, General Motors Corp. took a close look at its manufacturing operations in 1980. The automotive colossus did not like what it saw. Devices, such as vision systems, numerical controllers and mainframes, operated in stand-alone fashion. Analysts have estimated that only 15% of factory devices talk to one another.

This lack of integration has prevented GM and other manufacturing companies from bringing into existence computer-integrated manufacturing (CIM), a scheme for increasing the productivity of U.S. manufacturers that was first proposed in the early 1970s.

To perk up vendor interest in MAP, the automotive company flexed its purchasing muscle and announced it would only buy products for its factories that complied with MAP.

GM realized that its continued success hinged on the ability to integrate the wide range of equipment housed at its factories. So, the company began to search for a means to tie various devices together.

Two years later, independent of GM, the International Standards Organization (ISO) began work on its Open Systems Interconnect (OSI), a seven-layer network model designed to connect various manufacturers' equipment. In theory, any product that adheres to the OSI model should easily work with any similar product, a CIM prerequisite.

GM became interested in the OSI model, so interested in OSI that GM established a task force to tailor the model to the factory. GM's version of the network model is called Manufacturing Automation Protocol (MAP).

To perk up vendor interest in MAP, the automotive company, one of the world's largest computer users, flexed its purchasing muscle and announced that it would only buy products for its factories that complied with MAP.

Not surprisingly, a number of vendors quickly fell into step. Large companies, such as IBM, Honeywell, Inc., Digital Equipment Corp. and Hewlett-Packard Co., pledged support for MAP. Small companies, such as Concord Data Systems, Inc. and Industrial Networking, Inc. — a joint venture between Ungermann-Bass, Inc. and General Electric Corp. — are positioning themselves primarily as MAP suppliers.

Users are also taking a close look at MAP. The MAP Users Group, sponsored by the Computer and Automation Systems Association of the Society of Manufacturing Engineers, has grown from 60 members at its initial meeting in June 1984 to its present 1,600 members.

GM has a staff of approximately 26 full-time employees and 10 contractors devoted to MAP. The staff should grow significantly in 1986. John Deere Co. and Kaiser Aluminum & Chemical Corp. have prototype MAP networks up and running.

Industry analysts forecast that the number of prototypes will dramatically increase in 1986. HP, IBM, Eastman Kodak Co. and GM are some of the companies planning pilot projects.

Despite all the progress, there are still

ILLUSTRATION BY KEN CONDON

many obstacles that MAP has to overcome. The prototype networks are very expensive and support only a very small proportion of MAP's potential capabilities. Design decisions have to be made because the OSI model supplies a great deal of flexibility. "For each of the seven layers, there are 20 to 150 options," noted Robert Blanc, director at the Center for Computer Systems Engineering at the National Bureau of Standards in Gaithersburg, Md. The model works much like a blueprint, and the MAP Users Group has to decide what type of houses it wants to build.

The model's first layer is the physical link; it is followed by data link, network, transport, session, presentation and application layers.

Acceptance of international standards consists of four steps. The first step, working papers, represents a rough cut in which all participants are expected to comment. Draft proposals forge a version that melds the initial comments. The third stage, draft international standards, signifies that the standard has basically been accepted, and only cosmetic changes will be made. The final stage is the international standard in which few changes are ever made.

OSI's first layer, the physical link, outlines how data should be sent over a transmission facility such as a coaxial cable or fiber-optic wire. The layer specifies four functions: how one device would be plugged into another; how electrical currents travel so that both sending and receiving stations understand the currents; what signals are necessary to establish a connection; and how data is packaged and sent from one device to a second.

The second layer, data link, commands the physical link in a manner similar to the way the brain moves arms and legs. The data link activates, deactives and maintains a link.

Layers 1 and 2 are based on the work of another standards organization, the Institute of Electrical and Electronics Engineers, Inc. This group has produced a series of local-area network standards with Ethernet probably the best known. MAP works with the IEEE 802.4 standard, a draft international standard that specifies how a 10M bit/sec. broadband token bus network should be constructed.

As one might expect, the lowest levels represent the most mature sets of MAP standards. Yet, significant changes to these levels will be made in 1986. MAP specifications will incorporate support for carrier-band transmission.

Carrier band is needed because many factories consist of small, enclosed work groups. For example, a group of machines may be dedicated to drilling a hole in a board and placing a peg in the board. Usually, these devices communicate only within their areas and do not need to be connected to a factory's principal 10M bit/sec. network.

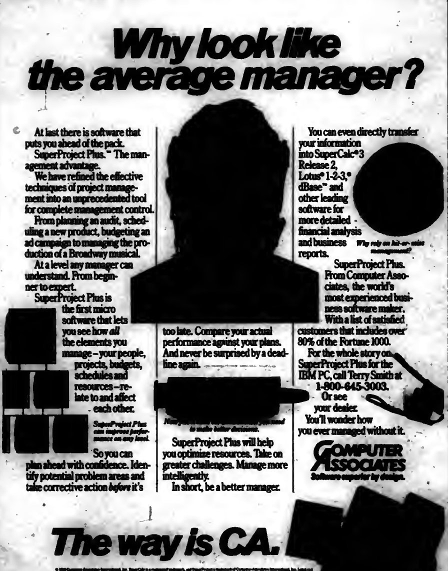
Supplying these devices with their own networks frees up the main network and supplies the smaller group with fast response time, which is needed to keep robots and other devices drilling the proper holes.

Addition to lower layers

Another addition to the lower two layers is a new method of signaling, called immediate acknowledgment. Whenever one MAP device attempts to communicate with a second, it transmits data as well as the necessary signals to establish a link. If there is a problem establishing the connection, the data is lost.

With immediate acknowledgment, data is not sent until both stations acknowledge that the connection has been made.

The third layer, or network layer, supplies routing translation capabilities between MAP networks. It should be noted that the third layer is only concerned with delivery of data. Once data arrives, applications may be unable to work with



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it. Higher level layers have various responsibilities for translating data so it can be used with specific applications.

The ISO model specifies two types of connections for the net layer: connection oriented and connectionless.

MAP supports connectionless network service, an international standard. The alternative, connection-oriented service, works with a variety of networks more easily than connectionless networks.

However, easier connectivity comes with a price — lower performance. Gary Workman, a staff development engineer who coordinates a standards development team at GM, listed a number of performance issues that concern the third layer: How expensive is it to support intranetworking? Would MAP networks have to support both types of services? Should MAP simply supply gateways to other systems? Would support for the two services tax network performance?

MAP issues for 1986

In 1986, the MAP steering committee will discuss these issues; a decision concerning inclusion of connection-oriented service will not be made for at least a few years.

Level 4, the transport layer, supplies error checking schemes required in addition to those supplied in Layer 2. There are four classes of error checking schemes for this layer; all are draft international standards.

Class One represents the most rudimentary functions and Class Four the most complex.

A Class Four facility checks for out-of-sequence bits to determine if data was lost or defective packets of data were sent. The layer's flow control capability will hold onto data when it knows that more is coming. Once it gets that data, it passes the data to the next higher layer.

Layer 5, the session layer, establishes, manages and terminates sessions between two applications. Unlike the fourth layer, MAP has chosen to work with the simplest of the three ISO layer five options: basic combined subset, a draft international standard.

The sixth layer, or presentation layer, is the murkiest layer: MAP has not formally adopted any of ISO recommendations for this layer, which are draft international standards. This level is concerned with formatting files and application data so that it can be used by a variety of machines on a MAP network. This layer presents difficult technical challenges, for its protocols have to be able to format data for machines that may be based on 8- or 32-bit microprocessors. Although MAP has not adopted any of Layer 6's standards, some completed work by the ISO for this layer will probably be incorporated into MAP in 1986.

The seventh layer, the application layer, supplies a number of facilities that enable users to locate and move data through MAP networks.

Currently, MAP includes two of the many options that are available for this layer: Common Application Source Elements (CASE) and FTAM, a file access method.

CASE supplies a toolbox of functions so users can select or merge information. It also includes facilities for items such as identification numbers and passwords. FTAM moves information from one device to another.

Despite the relative instability of the various layers at this point, MAP seems to be gaining acceptance. MAP's only competition would come from vendors supplying proprietary factory networks. Two of the leading vendors in that market, Allen Bradley and Gould, Inc., said they will replace current offerings with MAP networks.

Vendors are busily working on products that they think will comply with emerging standards. "We should have a compiler for the sixth layer sometime in 1986," noted Harold Folts, executive director at Omnicom, Inc., a Vienna, Va., software and consulting firm. "We won't be the only vendor offering this type of product next year."

Yet, there remains some uncertainty for both vendors and users. To develop MAP products, vendors must fork over a great deal of money for research and development. A Siemens Corp. official noted that each of the 21 vendors at the Autofact '85 MAP demonstration spent $1 million designing its MAP product. Despite the cash outlay, equipment at the demonstration malfunctioned; files were lost and inventories were miscounted.

Vendors caught in catch-22

Also, vendors are caught in a catch-22. If they develop products and there is no MAP market or MAP standards change, they will not be reimbursed for their R&D investment. If they wait, competitors may be better able to deliver a product when the market emerges.

MAP represents a sizable investment for users as well. Because the products are in the first stages of development, they are expensive. International Data Corp. (IDC), a Framingham, Mass., market research firm, estimated that connecting a device to a MAP network costs $3,000.

Also, because there are so many options in each of the seven layers, users could be investing in equipment this year that would become obsolete the following year.

Because GM is driving MAP, some users are concerned that MAP will meet only GM's manufacturing needs. "General Motors has the money and the commitment to make MAP work in its factories," according to Kim Myhre, an IDC analyst. "I'm not sure that other companies have the resources to ensure that MAP works for them." ■

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View from Capitol Hill

Legislators add high tech to the agenda

By Mitch Betts

The politicos of Washington, D.C., hate to make predictions about legislation in the U.S. Congress. The reason is simple: The predictions are wrong about as often as weather forecasts are wrong, because the political winds of Washington, D.C, can change direction as unexpectedly as any other sort of wind.

But legislators and lobbyists will talk about those issues that "conventional wisdom" says will top Congress' agenda in 1986. (The appeal of attributing predictions to conventional wisdom is that if they turn out wrong, you can say that you never believed them in the first place.)

'Conventional wisdom' says that the 1986 agenda will feature three major high-technology issues: trade, taxes and computer crime.

Conventional wisdom says, according to interviews with several Congress watchers, that the 1986 agenda will feature three major high-technology issues: trade, taxes and computer crime.

Of course, the same topics were debated throughout 1985. But some final resolution of these issues is more likely in 1986, when Congress will be working hard to develop a favorable record for election campaigns in the fall. Recall, for example, that in the fall of 1984 Congress passed a big, popular anticrime bill, which included a provision against trespassing in government computer files.

"I think the things that are most likely to get legislative attention and action before the elections are those things that are either big sellers back home or those that are of such little interest back home that a congressman can do whatever he wants and not get any negative votes," commented Kenneth B. Allen, vice-president of government relations for the Information Industry Association (IIA).

One of the major issues affected by the 1986 congressional elections is what to do about the big U.S. trade deficit and allegations of unfair trading practices by Japan and other countries.

"I'm not sure what form it'll take, but the conventional wisdom is that there is enough momentum to pass a trade bill before Congress goes home for the elections," observed Ted A. Heydinger, vice-president for government relations at the Computer and Business Equipment Manufacturers Association (CBEMA).

The legislative proposals range from strong measures — a 25% surcharge on imports from certain trading partners — to milder actions, such as encouraging a new round of international trade negotiations.

CBEMA's position is to oppose import surcharges and other protectionist measures that would invite retaliation from important trading partners, and Heydinger noted that President Reagan has promised to veto such protectionist legislation.

Consequently, focus has shifted to several milder trade bills. For example, 26 senators — Republicans and Democrats — recently introduced a compromise bill called the Trade Enhancement Act (S. 1680). It has numerous provisions that strengthen existing trade laws, such as requiring the administration to act within 18 months if it finds that certain for-

ILLUSTRATION BY DAVE RIDLEY

eign trade barriers are unfair to U.S. interests.

Because of its bipartisan support, the bill may become the major trade measure in the Senate in 1986, according to Sen. George J. Mitchell (D-Maine). "I'd be willing to set aside some time . . . for action on the floor early next year," added Senate Majority Leader Robert Dole (R-Kan.).

Likewise, the multifaceted trade bills passed by the House Energy and Commerce Committee (H.R. 3131 and H.R. 3777) are likely to get attention from the House Ways and Means Committee early next year and then votes by the full House. It is too early to tell which of the many provisions in the House and Senate bills will prevail once the negotiations and votes are finished.

Debate over tax reform

The other broad issue affecting the computer community is the continuing national debate over tax reform, aimed at eliminating most tax credits and deductions in return for lower tax rates and a simpler tax code. In this context, the computer industry has been working hard to extend the federal tax credit for research and development, since it is scheduled to expire at the end of 1985.

The R&D tax credit has had its ups and downs in the House Ways and Means Committee, but it appears that an industry-backed compromise by Rep. J. J. Pickle (D-Texas) will prevail in the House. The compromise would extend the R&D credit for three years but cut its percentage from 25% to 20%.

CBEMA also was worried that R&D expenses would be taxed by a new minimum corporate tax — in that the minimum tax would be based on total revenue, rather than the present method of taxing revenue that remains after expenses have been deducted — but Pickle's compromise scuttled that proposal, to the relief of CBEMA lobbyists.

Extension of the R&D credit also is a top priority of the Association of Data Processing Service Organizations, Inc. (ADAPSO), according to Olga Grkavac, senior director of government relations. Moreover, ADAPSO hopes to overturn an Internal Revenue Service ruling that makes computer software subject to the personal holding company tax. "The most obvious vehicle for that [exemption bill] would be adding it to a comprehensive tax package," she said.

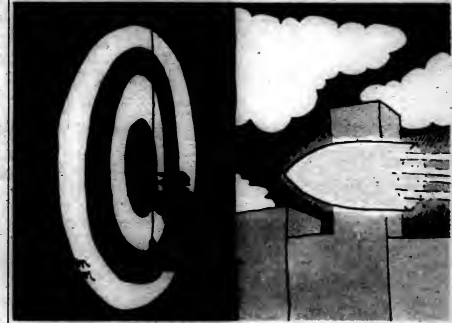
ADAPSO's other high-priority issue is computer crime and privacy. The fastest moving bill in this arena is the Electronic Communications Privacy Act of 1985 (S. 1667), which the association supports with a few clarifying amendments.

The bill applies the same privacy protection now afforded to telephone conversations to all sorts of electronic communications, while in transmission and while stored in a computer system.

At the same time, legislators on the House and Senate judiciary committees are pushing crime bills that would outlaw trespassing or altering data stored in private sector computers. It is not yet clear whether the electronic privacy and computer crime bills will be merged or passed separately.

Addressing this point in recent congressional testimony, ADAPSO spokesman P. Michael Nugent said, "I wish to make it clear that our support of electronic communications privacy legislation does not in any way diminish our support for computer crime legislation. We believe that in addition to legislation which recognizes and protects fully the privacy of

> ***'You can no longer deal with computers totally separate from the communications links.'***
>
> **— Kenneth B. Allen**
> **Information Industry Association**



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[illegible] U.S. Department of Justice [illegible] the bill's [illegible] would hamper law enforcement.

Outlook: The bill has widespread and bipartisan support. However, it faces the obstacles, [illegible] objections from the [illegible] with [illegible] computer [illegible] legislation often comes just before Congress recesses for election campaigns.

electronic data communications, there is also a need to provide private sector computer systems with criminal law protection against unauthorized computer trespass.

"These are two separate issues, however, and both require a legislative remedy," he testified.

The IIA, which represents on-line data base service vendors and some videotex firms, said it is another industry group that wants Congress to pass computer crime legislation, the IIA's Allen said. "We want to make sure that both the owners of the data bases and the vendors have an adequate degree of protection," he said.

The IIA also supports the general thrust of the Electronic Communications Privacy Act, Allen said. "As the technology has changed, you can no longer deal with computers totally separate from the communications links. We're very concerned that those data transmissions are also protected — not only protecting the vendors but also the people who are putting the data into the system," he added.

Elsewhere on the congressional agenda will be a host of lesser issues, which will get at least some staff scrutiny or public hearings.

Lobbyists interviewed by *Computerworld* cited the following issues:

■ The Federal Communications Commission will render a decision on loosening restrictions on the participation of AT&T and regional holding companies in enhanced business services. "Depending on what happens at the FCC, you're looking at least at more extensive oversight and then perhaps at some legislation," ADAPSO's Grkavac said.

■ Congress will continue to manage the electronic filing systems at the Securities and Exchange Commission (SEC), the Patent and Trademark Office and other agencies [CW, July 15]. "To the extent that there is little or no guidance governmentwide about these systems, the Congress will find itself in the role of answering policy questions that come up," the IIA's Allen said. "I suspect we'll see more congressional oversight as well as some policy guidance coming out of the Office of Management and Budget," he added.

■ The IIA will keep an eye on any amendments to the Freedom of Information Act to ensure that data base vendors can obtain government data through the act and also to make sure that the government does not carelessly release proprietary business data to competitors.

■ The transborder data flow issue is becoming an international trade issue as Congress and the administration investigate foreign trade barriers to data communications.

■ CBEMA has formed an environmental council, which in 1986 may take an active role in environmental legislation affecting the computer industry, such as the Superfund program for cleaning up toxic wastes.

■ The computer industry has called the Pentagon's new procurement rules too burdensome [CW, Nov. 18] and is lobbying to kill rules that would require them to turn over competitive pricing information.

■ Aware of the electronic interconnection of world securities markets, Sen. William Proxmire (D-Wis.), Rep. John Dingell (D-Mich.) and the SEC are investigating whether U.S. investors involved in the international markets are adequately protected from fraud.

While all of this activity goes on in the federal arena, the Data Processing Management Association will be focusing its efforts at the state level on such issues as VDT health standards and computer crime, according to Joseph E. Collins, governmental affairs manager.

"We want to be taking a more proactive stance on the issues and in government affairs," Collins said. ■

Outlook '86

"Reduced instruction set computing, although it is an idea with merit, by no means offers the enormous advantages that some seem to attribute to it. Thus far it has not been significant at all in the marketplace. There are a few vendors with products that you could say offer RISC-like or RISC-influenced architectures, but they certainly are not pure RISC architectures. I don't think anybody will ever offer viable commercial systems based on pure RISC architectures. It raises a valid question about what ought to be an instruction set. It's kind of a corrective to the idea that you just keep throwing more and more things into the microcode. . . .

"RISC was obviously much more talked about than implemented in 1985. As people start using it more in 1986, it will [illegible]

"IBM is expected to announce a RISC-based workstation product soon. Hewlett-Packard Co. is betting the ranch on RISC. Ridge Computers, Inc. is shipping machines. But there is no RISC market, per se. RISC is a means toward an end, an approach that some vendors think will enable them to deliver computers at an attractive price. Like pipelining or cache memory, RISC will be something on the spec sheet, not a factor in a purchase decision.

"Throughput of useful work will be the determining factor in the debate between complex and reduced instruction set computers. . . .

"In applications where absolute design correctness and bug-free instructions are essential, RISC may have an edge over [illegible]

[illegible] *There have, however,* [illegible] *the most notable being* [illegible] *. . . require these* [illegible] *such as the relational* [illegible] *like to promote their* [illegible] *purpose, they have* [illegible]

"In recent years [illegible] *characteristics."*

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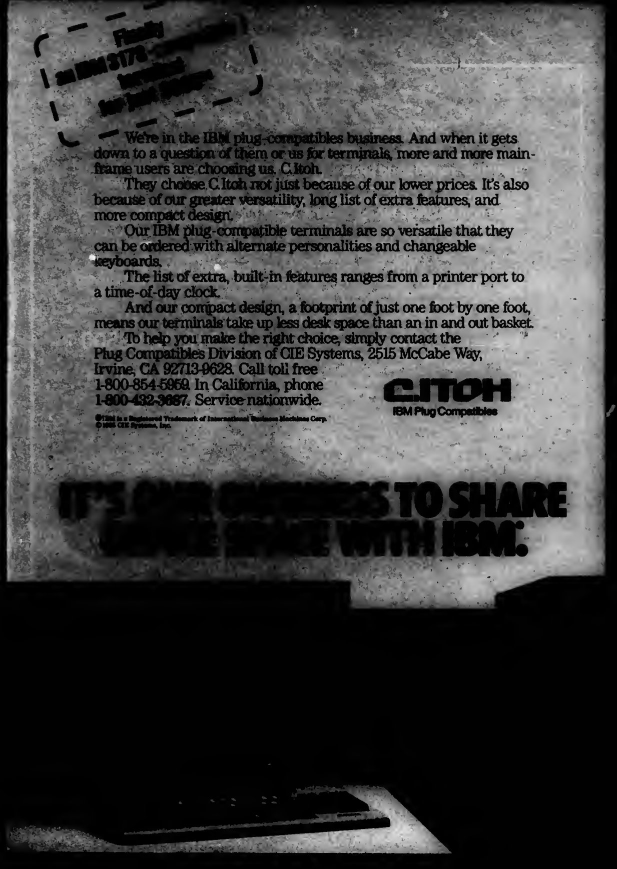

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Micro-to-mainframe links

An uphill climb to a data access solution

By James Martin

Analysts and users agree that, despite numerous shortcomings, micro-mainframe link technology should begin approaching maturity, or at any rate adolescence, in 1986.

IBM's emerging LU6.2 protocol for the Personal Computer and its Token-Ring network are seen as two positive advances that could begin to change the shape of the micro-host industry by late '86. By most accounts, it will be a year of growth and transition for the industry as end users require more host information at faster speeds to complement micro applications.

Future Computing, Inc. of Richardson, Texas, is expecting twice as many terminal emulation boards — 410,000 — to be sold next year than were sold in 1985. International Resource Development, Inc. of Norwalk, Conn., expects sales of micro-mainframe link products, including software, modems and emulation boards, to total $450 million this year, tripling to $1.3 billion by 1987.

In the past two to three years, the capabilities of the personal computer have been enhanced by mainframe-link technology, combining stand-alone processing with access to host data and services. Businesses are finding a great deal can be accomplished on the micro without tying up the resources of the mainframe.

"Three years ago, a personal computer was somewhat rare in a corporation and was used in stand-alone mode all the time," said Hassen Baghai, senior manager for telecommunications and microcomputer services at McCormack & Dodge Corp. in Natick, Mass. "People are just now really beginning to understand how to integrate the personal computer into a network. They're also thinking about uploading, whereas before downloading was the only consideration."

David M. Fredenburg said his company "hardly ever buys a personal computer anymore without an emulation board. We find we can do a lot on the micro side without tying up the mainframe." Fredenburg is manager of product assurance and the data center at Simmons Precision, Vergennes, Vt.

Along with the projected rise in sales, the micro-mainframe link industry has seen an increase of vendors in its relatively short history. Digital Communications Associates, Inc. (DCA) of Alpharetta, Ga., is considered to be a leader in terminal emulation boards, up against IBM and its emulation products. Three California-based companies — AST Research, Inc., Irvine, Calif.; Forte Data Systems, Inc., San Jose, Calif.; and CXI, Inc., Palo Alto, Calif. — have been gaining ground in the market, among others. Additionally, traditional mainframe software vendors have begun addressing the market from their spectrum, with limited success.

Businesses are finding a great deal can be accomplished on the micro without tying up the resources of the mainframe.

Observers generally agree that a shakeout in the link industry is likely, given the increasing number of vendors using a "reinvent the wheel" approach. "There are a lot of 'me too' products out at the moment," observed

ILLUSTRATION BY MARC TAFFET

Naomi Kalmus, senior consultant with International Resource Development, Inc. "The lack of any real differentiation results from users and vendors not being clear as to what is needed most. Users just want to get to the data but don't always understand how, while MIS is often wary of allowing them access." Kalmus added that a consolidation of some vendors could occur, but declined to speculate which companies might be candidates.

The often conflicting needs of end users and MIS is representative of the problems involved in micro-mainframe technology and is said to be one reason the industry's development has been slow, analysts said. Some observers say they believe that not until certain MIS concerns are allayed will there be any real industry growth, while others believe links are only a temporary answer, with more advanced solutions supplanting emulation boards and software and coaxial cables in the future.

But, many agree that no matter what technology develops, much of the micro-host concerns must be worked out between MIS and and users.

At the heart of MIS concerns is the security of confidential information. The MIS department worries that end users could gain inappropriate access through links to proprietary data, which could jeopardize corporate information. A related concern is the protection of valuable mainframe data once downloaded to a vulnerable, portable floppy disk.

"I do feel that security concerns are definitely a barrier to the industry's technological advancement, which in turn limits the link users' ability to get information from the mainframe in a more timely manner," said Bill Golden, project manager/microcomputers, at Wendy's International, Inc. of Dublin, Ohio. "Our biggest concerns with links are unauthorized access and the issue of controlling information once it gets to the personal computer."

Golden said that when mainframe data is requested by personal computer users, the data is downloaded onto a disk by the MIS department and then handed to the user. "We don't permit any direct remote dial-up access or even a callback system," he added. "That mainframe information is worth more than the 95 cent disk."

Wendy's purchased terminal emulation boards to eliminate a single user from having to toggle back and forth from a personal computer to a 3270 terminal for multitasking applications. At present, only a few end users have read-only access to host information, Golden said. "The folks who are transferring information are getting [mainframe] data they would have access to anyway," Golden said.

While providing security, these processes are often slow and cannot always provide users with timely information. "Although we are not doing much direct file transfer now, logic would say we will evolve to that after some issues are worked out with security, policies and procedures and so forth," Golden said.

Golden said he does not foresee any technological solutions to the security problem forthcoming. "That doesn't mean there isn't a solution out there," he added. "It's a tough situation, but someone at some point in time will find a way of doing it."

Lee Doyle, communications analyst for the International Data Corp. (IDC) in Framingham, Mass., agreed that vendor attempts to solve security problems have been disappointing.

> ***'Security concerns are definitely a barrier to the industry's technological advancement.'***
>
> **— Bill Golden, Wendy's International**

"But it's largely a problem within the company itself of defining what information it has, who should have access and how the information should be distributed."

The possibility that users can upload incorrect information after having manipulated it on the personal computer is also a concern. "With current technology, there is a lack of protection in uploading," said Philip Dorn, Dorn Computer Consultants, Inc., New York. "Don't put data back up there if it's wrong. There should be some system of checking and verifying the information before it is uploaded."

Security and data protection are but two MIS concerns in the micro-mainframe area. There are others:

- The delays and high costs of new technology. "There was a lot of hype about new micro-mainframe products in '83 and '84 with many of them not delivered until '85," Doyle said. There have not been any significant advances since, he added, with new releases in 1985 offering only "minor functional improvements."
- The complexity of technology. Many end users who could benefit from accessing data from the mainframe often do not have the time or the inclination to learn how to use complicated link packages and mainframe data bases, analysts agreed.
- Incompatible data formats. Some file transfer software programs allow movement of data on a per-file basis, but it often arrives raw and in need of additional processing.

In addition, there is almost no generality or compatibility among micro-mainframe links, Dorn said. "One

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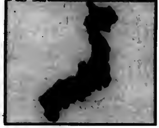

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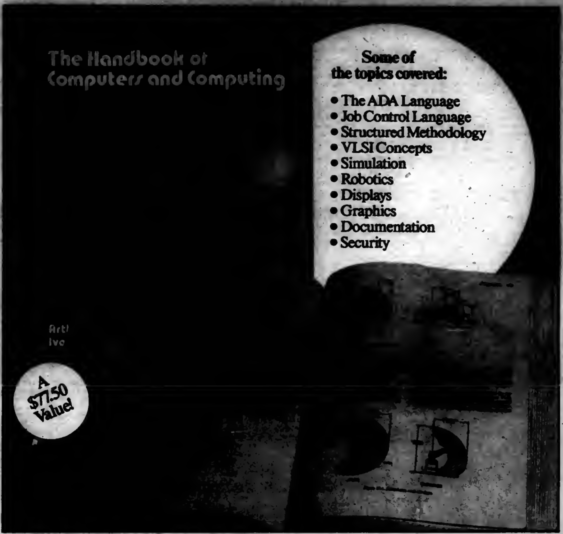

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needs to use link A for one purpose, B for a second purpose and C for a third. You really have to know what you're doing in advance."

■ The lack of any significant open architecture link. This has held some other potential link users at bay. Most systems are based on proprietary architectures in which a micro-host software link offers access only to data residing on that same vendor's mainframe software. An open architecture link would allow users to access information from other software programs as well, but analysts say they believe such a link is not likely soon, if at all.

■ The inability to use the microprocessor in tandem with terminal emulation. Much of the technology available turns off the personal computer processor while emulating a 3270 terminal, which underutilizes the personal computer. "There needs to be a way to communicate between the personal computer and the mainframe and still use the power of the personal computer," Doyle said.

■ Vague definitions of micro-mainframe links. Analysts agree that many vendors are touting micro-mainframe solutions while the actual products offered might be anything from a coaxial cable to a complex mainframe software program. This has created misunderstandings among users and, thus, some apprehension.

■ MIS and end-user uneasiness. According to Golden of Wendy's International, much of the technology is "still too new and a little scary. People make decisions based on what is known at the time, and while I might feel insecure about it, it seems the responsibility of vendors to take away that insecurity if they want to sell a product."

IBM's recent announcement that its LU6.2 protocol will be available at the personal computer level has created high hopes among users of micro-host links. IBM's Advanced Program-to-Program Communications (APPC) is said to offer program-to-program processing that will make full use of the personal computer as an intelligent terminal while connected to a mainframe. Finally, users and analysts hope LU6.2 will offer a solution to integrating distributed systems and will become the industry standard for communications.

It will take years, before the full benefits and effects of LU6.2 are felt. "There are not enough pieces yet of LU6.2 to put it all together," said Baghai of McCormack & Dodge. Its full potential will not be realized, he added, until it can be fully supported on IBM's Token-Ring network, which will support APPC.

LU6.2 is creating "a lot of consternation," Kalmus said, with potential users and vendors wondering if they should "go with the standard or wait it out and see what develops, how IBM promotes and supports it. People will be trying to work out new strategies and decide which products will best fit what the users want. I don't see any clear trend emerging until the end of the year."

Some say the advance of emulation products and LU6.2 will shift the role of the mainframe. "Most companies are moving toward the mainframe as data base machines, as a depository of information, rather than classic data processing machines, with the personal computer doing the legwork," said Fredenburg of Simmons Precision.

"Over time, I expect to see the mainframe become more of a file server and large data base server for a number of intelligent devices linked by a network, as well as controlling access to host data," Doyle said.

"With the development of LU6.2, the mainframe doesn't need to supply all the processing power, especially with the IBM Personal Computer AT and the Intel Corp. 80386-based machine that is supposed to come next year from IBM, at your desktop," Doyle added.

IBM's protocol is not expected to be the solution to all existing problems with micro-host communications, however. "As personal computers become more powerful," Kalmus said, "the focus will be on software development [to facilitate micro-mainframe communications]. Also, workstations in the future will come with some kind of micro-mainframe communications capability built-in. But most important, MIS has to decide how much data is going to be transferred, what kind of security will be needed and how to handle different people working on the same data base at the same time."

A direct micro-mainframe link will not necessarily be the end-all answer, Doyle said. "It might be more efficient in the future to have a third level of mid-range processing handling data requests between the PC and the mainframe."

Said Baghai: "I don't see the terminal emulation board as an absolute means of linkage two years from now. I think local-area networks will take over, with gateways to the host, providing a means of access to the mainframe data base from anywhere in the network."

But the biggest hopes are for LU6.2 and the Token-Ring network. "I do a lot of work with telecommunications and local-area networks," Baghai said, "and I'm really excited about tying all this together in a consistent method.

"There's a lot of faith in the token ring to tie in a lot of different systems that can carry on dialogues between various pieces of hardware. Now we're getting to the point that the tools are there for this to be a reality, and the costs can be justified. We are just now on the verge of having all the pieces together to make that happen, and micro-to-mainframe links are just one part of that overall picture." ■

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Semiconductors

Fear and loathing on the comeback trail

By Maura McEnaney

The semiconductor industry will long remember 1985, and most in the industry fervently hope that the depressing news of the year can be filed away as history.

At the outset, predictions from the Semiconductor Industry Association (SIA) said 1985 would bring 22% growth in sales. Twelve months later, more than 60,000 jobs had been lost. Holiday shutdowns, wage reductions and salary freezes became almost commonplace. Announcements of layoffs and quarterly losses among chip firms dominated the headlines. U.S. chip sales plummeted by 28%. The year 1985 was labeled the worst in the industry's history.

As 1985 progressed, some companies could hang on no longer. Among them was Mostek Corp. of Carrollton, Texas. Once labeled an "industrial darling" and a leader in the 64K-byte random-access memory (RAM) market, Mostek closed its doors in October. Weeks later, parent company United Technologies Corp. sold Mostek to Thomson S.A. of France for $71 million.

The industry was stunned. How could a year that started out looking so rosy end up to be such a bust?

In fact, as the year went on, more and more chief executives chimed in with the view that 1985 was worse than even the earlier recessionary busts of 1975 and 1981.

Executives at the nation's largest semiconductor firms admitted they were taken by surprise. Sales within the computer industry — which absorbs about 40% of chip sales — flattened out. At the same time, the executives said, a shortage of chips during the 1984 boom year caused end users to stock up on semiconductors. As fewer end products went out the door, inventories piled up. Demand dried up and prices fell. Through it all, Japanese competition escalated.

At the SIA annual forecast dinner, mournfully labeled "the last supper" by National Semiconductor Corp. President Charles Sporck, attendees were not looking for an explanation of the past but an answer to the pressing question, "How much longer could it all last?"

Industry forecasts for 1986 range from the SIA's optimistic 18% increase in worldwide sales over 1985 to a more moderate 9% estimate from Dataquest, Inc. in San Jose, Calif.

The semiconductor industry was stunned. How could a year that started out looking so rosy end up to be such a bust?

According to the SIA, 1986 will bring a dramatic turnaround in worldwide sales, as the excess inventories built up over the past year begin to dwindle. In October, the association predicted that worldwide chip sales for 1985 would total approximately $21.6 billion, well below the 1984 total of $26 billion. Sales should continue to increase 23% and 22.6% during the next two years, respectively, the SIA noted, bringing the industry up to $38.4 billion by 1988.

Results of fourth-quarter chip sales, due to be released in the next couple of weeks, could be an indication as to whether or not recovery is on the way. And by as early as October,

ILLUSTRATION BY ROB SAUNDERS

some hope appeared to be emerging.

The SIA's monthly measure of new orders hit the highest point in more than a year during November. The month's book-to-bill ratio of 0.9 indicated that for every $90 of new orders received, semiconductor manufacturers shipped $100 worth of chips. The November statistic exceeded an earlier high of 0.82 in October and a low of 0.65 in January. Current orders remained 21% below year-ago figures, the SIA said.

'Hope amidst the gloom'

According to Dataquest analyst Howard Bogert, the increased bookings bring forth "some faint glimmers of hope amidst the gloom," currently pervading the industry.

"It's hard to imagine it could get any worse," said Larry Hootnick, senior vice-president at Intel Corp., which this year announced approximately 2,300 layoffs. Further worldwide layoffs are also expected, pending fourth-quarter results, the company announced in the fall.

During the third quarter, Intel shocked industry watchers by announcing it would discontinue manufacturing dynamic RAM chips. The dynamic RAM market, pioneered by Intel and other U.S. chip makers, has been quietly absorbed by Japanese manufacturers able to produce the chips for less.

Even though U.S. firms had long been aware of the Japanese infiltration into the dynamic RAM market, industry observers were shaken by the Intel announcement.

"That was the final blow to us," Hootnick said. "It was a sad affair."

Talk to some industry veterans and they will tell you they have seen it all before. Semiconductors are a volatile market, they will say, quickly pointing to 1975. Then, like now, billings were down by 30% — but the market was one-tenth of what it is today. By 1982 the industry rebounded with the popularity of video games and the emergence of the personal computer. Recessions, those veterans will say, are just part of the business.

"The high peaks and the deep troughs will continue throughout the industry," according to Michael Kubiak at Kidder, Peabody & Co. Kubiak, formerly a member of the SIA's statistical team, said he believes 1986 is too early for a resurgence in the chip industry. Nevertheless, "the growth of the industry will continue through the end of the decade," he said.

Chip makers themselves tend to take a more realistic approach. "This is no longer a recession, it's a depression," said Edward Neubauer, senior vice-president for marketing at NEC Electronics, Inc., the U.S. subsidiary of Japan's NEC Corp.

New strategies for chip makers

The depression of '85 brought forth some new strategies from the chip makers, which hope that new products and increased research and development efforts will allow them to hold on to their dominant position in the erasable programmable read-only memory (EPROM) market.

"We are in a period of refocus now," according to Bob Andrews, director of new products at Zilog Corp.'s components division. Zilog, once a leader in the microprocessor market with its Z80 chip, has moved into other arenas, including embedded designs that can be used in products such as disk drive controllers. The company is also targeting the lucrative military market.

Although it is a subsidiary of a Japanese firm, NEC is not immune to the chip industry crisis. Japanese firms have felt the pinch of the worldwide semiconductor slump, but not as severely. Employment at Japanese chip firms dropped 5% in 1985 compared with 19% in the U.S. NEC would not announce year-end figures, but Neubauer said the firm expected to finish 1985 at about 27% below previous year sales.

"We will remain in the commodity dynamic RAM and memory market," Neubauer said. But the company will pursue what is known as the application-specific standard product market, where chips are made for specific products.

"Chip companies are adopting a narrower focus," Dataquest's Bogert said. "Instead of a mass market, they are looking for a boutiqoe market for their chips."

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> ***'It's hard to imagine it could get any worse.'***
>
> — Larry Hootnick
> Intel Corp.

Companies are also betting on product introductions to stir up business next year. At Advanced Micro Devices, Inc., which lost $15 million during the third quarter — a 136% change from the $42.1 million earned for the same period in 1984 — a succession of product rollouts is designed to increase visibility and lift spirits.

Still no layoffs

Although perhaps one of the hardest hit by the downslide, Advanced Micro Devices has adhered to a no-layoff policy. Shutdowns and pay cuts were implemented, however.

Launched in October, Advanced Micro Devices's Liberty Chip program unveils a new product introduction every week for a year. More than 63 different circuits — half of them proprietary products — will be introduced during the program, a company spokesman said.

But it is end-user products, and not new chips, that are key to the industry upswing, some say. "The saving of the semiconductor industry will have to emanate from the customer," NEC's Neubauer said. Just as video games and personal computers boosted the market in years gone by, the chip industry needs a driving force to keep it going. But according to Neubauer, "There is no product on the horizon today that can fill that void."

Cash in on R&D

This year NEC hopes to cash in on its ongoing R&D efforts, with the introduction of some 84 products. "The market is willing to accept new products now," he said.

The 32-bit microprocessor is one product on which many in the industry are willing to pin their futures. Although pioneered almost two years ago by Motorola, Inc., different versions of the 32-bit chip are on the drawing boards of most major semiconductor firms.

Intel's heralded announcement of its 80386 chip last summer had the industry buzzing with fervor about the prospects of the microprocessor. Zilog expects a 32-bit chip to be in production by 1986. NEC and Advanced Micro Devices also plan introductions of a 32-bit microprocessor sometime this year.

But bringing out a me-too product like the 32-bit processor could be detrimental to companies trying to hold the bottom line. "You have to consider the massive investment that will go along with bringing that product to market," Zilog's Andrews said. Intel's investment in the 80386 chip was estimated to be about $100 million.

No life jacket for industry

According to Michael Gross at the market research firm International Data Corp. (IDC), the growing popularity of 32-bit systems will not be the industry's life jacket. "AT&T's Unix is the most important component of the 32-bit system," not necessarily the chip that is used in that system, Gross said. "As Unix becomes the standard, the strategic value of the microprocessor itself will be diffused." Dataqucst predicts the now minimal demand for the 32-bit microprocessor will begin to ramp up this year, but sharp volume will not occur until the late '80s.

"In 1989 we will probably hit volumes equivalent to what we're shipping today in the 16-bit market," Andrews said. For Zilog, the worst appears to be over. "We had our bottoming out during the first quarter of '85," according to Andrews, who expects a 7% to 10% industry growth this year. But, he said, "Even with an increase of 19% to 20%, you are going to have to ship 40% to 50% more product because of the decrease in selling prices."

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>
> — Edward Neubauer
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Focuses are also changing at National Semiconductor Corp., which was pummeled by the industry downturn. The company lost $53 million during its first quarter ending in September, compared with a gain of $35.9 million in the same period a year ago. The company took 39 shutdown days and laid off more than 2,200 employees in 1985. Edward White, vice-president and analyst at E. F. Hutton & Co., predicted National Semi could soon announce losses of up to $41 million for the quarter that ended in December. White also estimated the company will lose $140 million for fiscal year '86 ending in May.

"We expect next year to be in the 10% to 15% growth range," said Gary Arnold, National Semi's vice-president of finance. "We started to see some improvement this fall as inventories reached zero in the user world." But what the future holds is still anyone's guess, Arnold noted.

"We're all heavily involved in R&D and are trying to bring in more unique designs that will create an insulation from the onerous market tactics of our competition," Arnold said.

Competition in this case does not come from other U.S. chip manufacturers, but from the East toward Japan, where much of the industry's hostility has been focused. Frustrated by what they called price undercutting and market flooding, the U.S. semiconductor industry is rallying around a cry for fair trade practices with Japan.

"Our industry is under siege," National Semi's Sporck told a San Francisco trade show audience in November.

According to Dataquest, the Japanese control 41.4% of the world's semiconductor market, while the U.S. holds 46.9%. Within the integrated circuit market, the U.S. holds a 55.2% share and Japan holds 37.5%, compared with the U.S.' 72.9% in 1977. "If current trends continue, the Japanese will easily be the world leaders in semiconductor and integrated circuit sales soon," Sporck told the audience.

In October, three chip firms — Intel, National Semi and Advanced Micro Devices — filed an antidumping petition with the U.S. International Trade Commission and the U.S. Department of Commerce against Japanese imports. The petition charged that the Japanese were selling EPROM chips at below manufacturing costs, thereby violating U.S. trade laws. According to the petition, 256K-byte EPROM chips sold for $17 each a year ago. In August, they sold for less than $4, well below what the Japanese claim is a $6 production cost.

The petition also asked that the U.S. impose import duties on Japanese manofactured chips.

In another complaint, involving Boise, Idaho-based Micron Technology, Inc., the Commerce Department last month found the Japanese were guilty as charged, recommending import surcharges for 64K dynamic RAMs sold in the U.S. A third ruling on a petition from the SIA has yet to be released.

"If the dumping cases are found to be valid, there may be tariffs on EPROMs and dynamic RAMs. However, that issue is being negotiated now," said Michael Maibach, government affairs manager at Intel.

Government aware of problem

Increased pressure from semiconductor executives has alerted the Reagan administration to the trade problems. And it appears as though the Commerce Department is willing to take serious steps to preserve the nation's leadership in the chip business. "The importance of semiconductors is not underestimated by government," according to NEC's Neubauer. "It's become the crude oil issue of the '80s."

The U.S. government is now preparing its own antidumping complaint against Japanese firms, accusing them of dumping 256K-byte dymanic RAM chips in the U.S. Plans of that complaint were learned in December while U.S. and Japanese governments were in the midst of semiconductor industry trade negotiations.

But trade issues are not the only global trend affecting the industry

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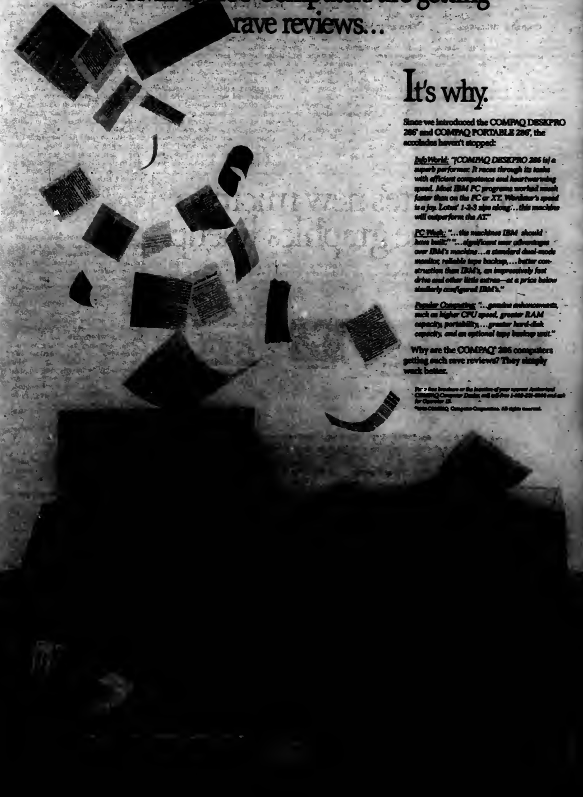

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today. According to IDC's Gross, "I believe the large consumers of the semiconductor parts over the next few years will increase their capacity to produce semiconductor parts."

Changing structures

Chip makers, too, are changing their structure. "Given the choice, the larger chip companies would prefer to be out of the memory business and have a collection of parts within their catalog," Gross said. But getting out of the commodity business is often a tough decision, simply because it represents about 60% of their business, he said.

Will there be more Mosteks? Gross does not think so. "Mostek was a pure memory business, and that is exactly where the industry has been hit the hardest."

To ensure survival, semiconductor companies need to create joint ventures with electronics companies, according to Gross. "Control at the end-user level is the key to success," Gross said.

Enough to keep a firm going

A single joint venture with one electronics conglomerate could be enough to keep a company going, he explained. "There really aren't that many electronics companies. Big companies are getting bigger. There might be 20 companies out there that consume 60% of the parts."

The year 1986 will certainly be a challenge to the semiconductor industry.

But vendors remain positive. NEC's Neubauer said he believes that, should all else fail, "We will have to work our way out of it — just like the old days."

Chip technology heartens makers

In and around Silicon Valley, semiconductor firms are looking at new technologies that they hope will spur the industry's resurgence.

Garnering the attention of industry vendors and analysts is the potential replacement of silicon chips with gallium arsenide, a crystalline substance that can increase the efficiency of chip transistors. Transistors built using gallium arsenide instead of silicon have a faster switching speed and use less power.

Companies are also putting more emphasis on a process called CMOS — complementary metal oxide semiconductor — which generates less heat and requires less power to run than widely used NMOS — N-channel metal oxide semiconductor — and bipolar construction processes.

"It's probably late to say that 1986 is the year of CMOS," said Andrew Rappaport, president of The Technology Research Group, Inc. in Boston. "It is very definitely the here and now."

Once thought to be slower than the more popular bipolar or NMOS circuits, CMOS has evolved to be a faster process, enough to take care of the majority of applications on the market today, Rappaport said. In the past, those circuits could not be built as densely or as easily as the NMOS or bipolar chips.

Although there has been some talk of a switch toward gallium arsenide chip construction, the technology is still in its early phases, according to Rappaport. "Gallium arsenide is where CMOS was 10 years ago. To make integrated circuits, you need to have high-quality consistent material. Gallium arsenide is not there yet." But, Rappaport said, "It is certain to play a role five to 10 years from now."

By 1990, National Semiconductor Corp. expects about half of its chips will be produced using CMOS. But according to Gary Arnold, National's vice-president of finance, gallium arsenide is still too far into the future. "It's too expensive and is limited to high-speed applications," he said.

"Obviously the trend toward CMOS will continue until it becomes the dominant technology in the industry," Advanced Micro Devices, Inc.'s Andy Rothman said.

This year may also bring new developments in user-programmable CMOS chips. User-programmable chips today primarily use bipolar technology. "1986 will be an important year for user-programmable CMOS," Rapappoport said. The Technology Research Group estimates that the user-programmable CMOS chip market will grow from about $5 million in 1985 to about $25 million in 1986. Bipolar semiconductors now need more power and can only be programmed once. The CMOS chips require less power, they are more complex and can be easily reprogrammed to facilitate testing purposes.

— Maura McEnaney

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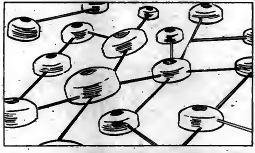
Applications integration



Have users caught the fever?

By Eddy Goldberg

When it comes to applications software, the subject of integration raises eyebrows, interest and sometimes tempers. It never bores. Everybody has an opinion on integration and an increasing number of vendors are now offering integrated product suites. Yet integration itself is not defined in any clear and easy way. If users and prospective buyers feel lost, they are not alone. Even vendors are confused about how their competitors' products are integrated.

"Integration is one of those terms like fourth-generation language, distributed processing or artificial intelligence," said Frank Dodge, president of McCormack & Dodge Corp. "It has a thousand different meanings."

Three or four years ago, the major applications vendors promised to integrate their applications, and the rush to market began. As 1985 ended, most of them had their integration schemes in place and were delivering their product suites, either whole or in part. But since each vendor began the evolution toward integrated applications with a different product base, the result today is a number of different approaches to the challenge of integrating applications.

The vendors, however, do share some common traits. "Most vendors are trying to do two things: deliver tools to the end-user community and integrate their product lines more and more," said Joe Southworth, vice-president of the human resources, product planning and financial divisions at Management Science America, Inc. (MSA) in Atlanta. "Philosophically, we're all trying to reach that user community with integrated software."

When looking at applications integration, there are some fundamental issues to consider. Is a single data base management system (DBMS) required for applications to be tru'y integrated? Or, is it enough to integrate at the user level with common tools used across applications and simultaneous, transparent access to multiple data bases?

Do users really want an integrated, single-vendor solution or the flexibility to combine products from many vendors? Will users afraid of becoming locked in to one vendor spend valuable MIS time and resources building bridges and interfaces between different vendors' applications to keep their options open?

Since each vendor began the evolution toward integrated applications with a different product base, the result today is a number of different approaches.

From where is the impetus for integration coming? Is it from vendors trying to sell more products? Or are these products a response to user demand for increased productivity and new ways of using information to gain a competitive edge?

Any perceived similarities in the different vendor approaches to integrated applications are more from an end-user point of view than from an architectural or design approach. The outsides look more alike than the insides, observers have said. Yet, many feel that for most end users, this is enough. Dodge is one of them.

"One of the major areas of integration is for

ILLUSTRATION BY MARC TAFFET

FORECAST

the user," he said. "If users see the same interface across different applications with the same kinds of screens, protocols and procedures, and if they can get at data bases from different applications in the same way, that is a degree of integration that is very important. Whether the internals of the programs allowing that to happen are identical, I don't think is an issue."

For example, MSA's approach to the challenge of integration is to unify its applications through a common user interface, a top-layer environment known as Information Expert, which the firm described as fourth-generation technology that uses expert system components. Despite the fact that its applications are not linked through a common DBMS, the company claimed there is no redundant data storage.

> ”
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> ***A firm's history is an all-important factor when considering the pros and cons of the different vendors' approaches to integration.***

According to Dennis Vohs, executive vice-president at MSA, "We want a common tool to be used across applications, and Information Expert is our tool for report writing, screen generation, updating systems and linking mainframes to micros. Information Expert works at a top layer, but it's also deeply entrenched in the architecture. It can be used in a very complex manner by a software developer or in a very easy manner by a casual end user."

Vohs said that MSA takes the idea of cross-application data access across single-vendor lines. "M&D coined the term 'borderless retrieval,' but it worked only for their applications. What we're looking at with Information Expert is the ability to go across the border of an application, across a whole product line into another vendor's or a customer's own applications, as well as our own."

Where MSA's approach to integration is essentially a top-down approach, Cullinet Software, Inc.'s could be described as bottom-up. Some end users said they feel that for applications packages to wear the banner of true integration, they must be linked through a single data base management system, a la Cullinet.

In describing the path that Cullinet followed on its particular march toward integrated applications, company officials said they began with the IDMS DBMS and used the firm's Application Development System/Online development tool to build applications on top of the DBMS. More recently, Cullinet has acquired applications from other vendors and has on occasion even bought a vendor outright, as it did with Bob White Computing & Software, Inc. for banking applications.

Cullinet claims that all its applications tap into the same data source, and that the DBMS allows users to access the data easily. Every change made in the DBMS is reflected in all the applications, thus eliminating the problems associated with modifying a suite of applications to reflect changes in the type of data a company maintains or how it is used.

Software International Corp. offers its own version of integration, which one analyst described as falling somewhere between MSA's top-layer interface and Cullinet's DBMS-based approaches. Software International's recently announced Intelligent Architecture design seeks to extract all the nonapplication-specific code into shared modules, such as those containing teleprocessing monitor and DBMS logic, with common user-oriented functions, such as query and security, residing in a shared, top-level system manager.

Although it has not yet fully achieved this goal, Software International has made solid progress toward it and the company is working hard to realize its vision of integration.

Barbara Siebert, a senior MIS analyst at ASEA, Inc. in White Plains, N.Y., found Software International's Masterpiece product the best vehicle for integrating her firm's applications. However, it has not been installed at ASEA, so is not yet proven in battle. It is the newest of the vendor's offerings to enter the fray.

"We chose Masterpiece because we already had several Software International packages and were interfacing them to one another. Masterpiece will tie them all together," Siebert said. "All the I/O and peripheral operations will be separated from the actual data processing operations. This means you can adjust one portion without affecting another. Also, installing additional packages is very simple."

Looking ahead and echoing the words of M&D's Dodge and MSA's Vohs, Siebert said, "As far as I'm concerned, integration is the way to go. Many users have to use two or three different packages and need the ability to float in and out of them. By having a fully integrated system where your screens and data editing are similar, there is a lot less confusion. This is as important for users as it is for MIS."

However, as 1986 begins, no one vendor's approach to integrated applications has won the day. A firm's history is an all-important factor

If you market software, don't miss February's Computerworld Focus. We're turning the entire issue over to your business.

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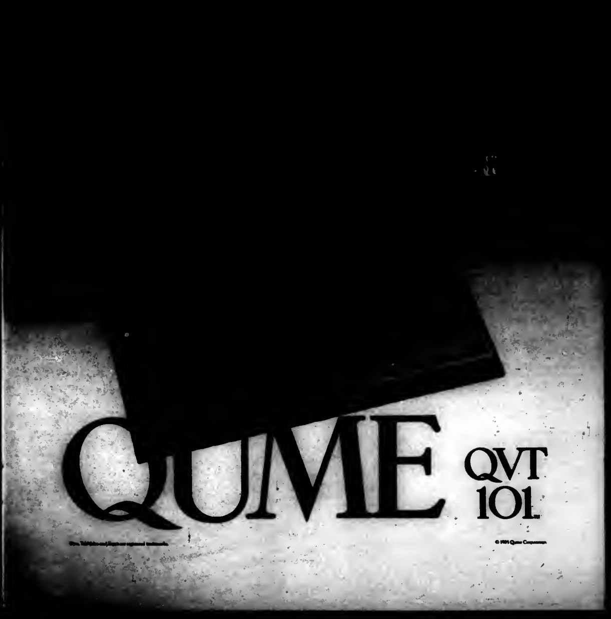

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when considering the pros and cons of the different vendors' approaches to integration. Which approach is best depends on a number of factors that vary tremendously from one company to the next. The issue might more accurately boil down to which is most appropriate for a given company's needs. The decision must take the largest possible view.

"If you look at the evolution of applications within a large company, you see a very heterogeneous pattern," said John Dacey, vice-president of Systems Engineering, Inc. in Weston, Mass. "They are from different time periods, technology bases; some may date from the mid-1960s, some from last year; there is Cobol, fourth-generation languages and other software development tools like application program generators. How a company can tie some of these systems together to provide more high-quality information is a hard problem. One approach is to replace all the packages and buy a one-vendor solution."

Robert Swetavage, MIS manager at Racal-Vadic, Inc. in Milpitas, Calif., did just that. He chose Cullinet's offerings as the solution for his particular needs [CW, Jan. 28], replaced both his hardware and software and started from scratch. He now has seven Cullinet packages in production running on an IBM 4341 Model 12 and two more in test on an IBM 4341 Model 10. Swetavage stressed the need for a commitment from top management when considering integrating aplications and said there were other issues he had to consider besides just the hardware and software.

> **99**
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> ***'Integration is sexy, but you have to question what value it will have within the business.'***
>
> **— Daniel R. Pfau**
> **Index Systems, Inc.**

"You can rub up against the culture of the company. This has to be balanced against the benefits you see from integration. Is the culture of the company capable of absorbing an integrated environment? Some companies are too freewheeling, too independent to make it work properly," Swetavage noted.

"Also, you have to be dedicated enough to the idea to take it in steps. You need to understand the basic module, the company's needs and how it all connects. You can put your finger in one module and mess up another one," he explained.

Still, in Swetavage's eyes, the installation of the 4341s and the Cullinet software has been a success. "We began the process in summer 1982. We wanted the best software on the market. It was IDMS at the time, and I still think it's the best. The others didn't really have an integrated environment. They looked like they were written with bridges."

The final test will come in the next couple of months, when Swetavage implements a postinstallation evaluation to determine if the return measures up to his expectations and the vendor's claims.

Despite the ascendancy of integration to the level of buzzword, moving to integrated applications in large-scale systems is not always the best idea for companies, according to many industry experts.

The value of integration

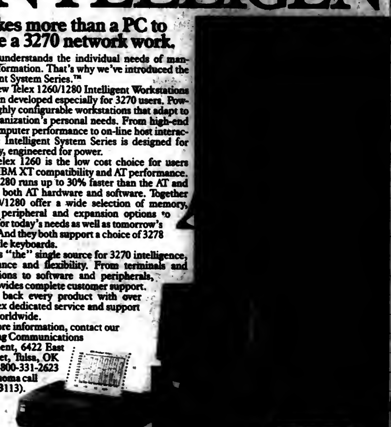
"You have to start by looking at the business, at your objectives, and let that drive your decision whether to integrate," said Daniel R. Pfau, principal at Index Systems, Inc., a Cambridge, Mass., consulting firm. "Integration for integration's sake will not get you anything. Corporations need to look at what kinds of information need to be integrated and to look at where the value would be derived from integration. There's a danger from overintegrating, and you may end up in a technological quagmire. Integration is sexy, but you have to question what value it will have within the business," Pfau said.

While some firms are in a position to replace their current applications, other firms may want to keep what they already have and make it work together. "In many companies," Dacey said, "the applications packages are a mix of commodity, off-the-shelf types, while others are highly specialized. They look for tools that will bridge the different data bases. They'll look for a DBMS, or some way to integrate their disparate applications."

Jack Keen, principal consultant for Input, a market research firm in Mountain View, Calif., also warned the user to beware when considering the purchase of integrated applications. "There is always a fair amount of hype in the software market. The user's challenge is to get beyond that hype and understand first what it is to be integrated, and then how a product is to be integrated."

Keen noted, "The benefit of software integration is that it allows management to get a better payoff from its investment in automation. There is greatly enhanced productivity because the integration packages force the different departments to talk to each other; it forces standards."

"But not everyone should consider integration," he said. "Buying software to force those changes could be a mistake. Departments tend to be isolationist. Some corporate cultures have individual departments that are entities unto themselves and have



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been for decades. There can be tremendous resistance to sharing."

Keen said he thinks that vendors today are still doing more missionary selling than beating eager user converts away from their doors.

But he also pointed out that the vendors would not be enjoying their present level of success unless there was a real need on the part of users to integrate some of their applications.

End user as instigator

T. Capers Jones, chairman of Software Productivity Research in Acton, Mass., gives more credit to the end user as the instigator of the move to integrate applications. "There is more pull from users than push from vendors. The time has come for vendors to realize that most companies have multiple hardware vendors and software packages. The most urgent need is the ability to interchange data across hardware and software developed by different vendors."

> ***'The time has come for vendors to realize that most companies have multiple hardware vendors and software packages.'***
>
> — T. Capers Jones, Software Productivity Research

So what do end users really want? Frank Dodge thinks he knows. "Users want a system that works. They want a support team so when they call up, they can get answers. They want it to be efficient enough on a machine so that they're not getting charged a lot of money by data processing.

"They want it to have a functionality but not be so flexible that it is too complex to use. Users want pretty straightforward stuff."

As to the question of which vendor approach best meets the needs of today's users, only time and the market will tell.

And whether the end users or the vendors are responsible for the current spate of integrated applications solutions, integration — like rock'n-'roll — is here to stay.

Techn[illegible] fast [illegible] people [illegible] communication, and [illegible]. But the [illegible]

[illegible] computing as well as a [illegible] camp developing. Vendors will work both camps. By the end of the year, the real interest will be in the factory automation market. MAP products will start to emerge as the area of high growth. There will also be a lot of people going into the business of building specialized servers — file servers, print servers, things like that."

— Ken Thurber, president, Architecture Technology Corp.

■

"Not only is there a productivity crisis in developing new applications, but there's an emerging [illegible] in the replacement of [illegible] applications that have fallen into decay. There are some new tools and technologies that are [illegible] programmer productivity to be improved, but technology transfer — the rate at which companies [illegible] and adopt new methods — is not very good. If software [illegible] continues to be a [illegible] activity, underfunded [illegible] without programs [illegible] capital [illegible] then the problem will [illegible] time. [illegible] of [illegible] to the problem. [illegible] many classes of software [illegible] end users will never [illegible] themselves. A [illegible] with the [illegible] the vendor [illegible] up- [illegible] where

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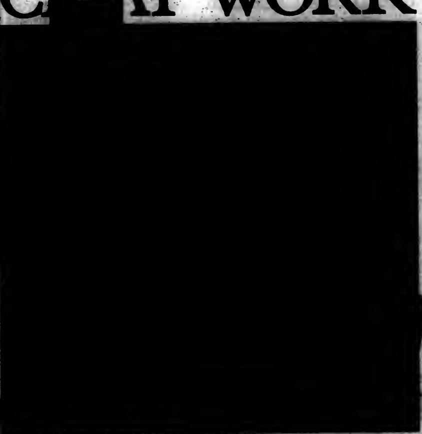

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A toast to invention

SOFTALK
John Gallant
CW Senior Editor

As one year ends and another begins, it may be refreshing to note that not all the programming gurus in the computer world are spending their time coding vital operational systems, and not every vendor is developing a spreadsheet clone or the umpteenth fourth-generation language.

What follows is just a small sampling of some of the less businesslike product announcements *Computerworld* has received. Whether these software offerings are still available — ah, the whims of the free market — is anybody's guess.

■ Don't pass up the only chance you'll get for the next 76 years to witness that glowing ball in the sky — yes, Halley's Comet. With the help of Sourceview Software International's Halley's Comet Locator ($49.50), you can pinpoint the comet by simply entering your latitude and date of observation. The software's star map will help you "catch the comet before it's gone."

■ This may be just a tad late, but Random House Software's HO! HO! HO! package might have made your Christmas complete.

For only $19.95, you could have hopped onto Santa's sleigh and flown through "five fun-filled Christmas adventures" in either the elf (beginner) or gnome (advanced) mode.

■ If it's more than just the Christmas story you're looking for, perhaps Bible Research Systems' The Word Processor package is for you. The package contains the entire text of the Bible, and the company even offers a series of related packages that allow the reader to search, display, print, cross-reference and record the Bible.

Bible Research Systems also markets The Greek Transliterator, which allows English-speaking users to "comprehend the original wording and messages of Greek literature."

■ Staying with the religious theme, Davka Corp.'s Bar Mitzvah Compu-Tutor ($49.95) is a "personalized study course" for bar and bas mitzvah training.

The package offers the complete haftarah Hebrew text and appropriate melodies along with a bouncing ball that helps students follow each syllable.

■ For those who've longed to coordinate the mayhem on the gridiron, Xor Corp.'s The NFL Challenge allows you pseudo-coaches to build a football team and develop a strategy with which to stomp the opposition.

■ If you've ever cursed those who hoard all the publications at work, Ebsco Industries, Inc.'s Routing package may be the answer to your prayers.

Routing ($435) lets you gain control over the circulation of periodicals within a company and gives you "flexibility in printing route slips."

■ Got a green thumb? Ortho Consumer Product's Computerized Gardening package ($49.95) "makes it easier for home gardening enthusiasts to keep their plants healthy and happy."

Naturally, the package runs on Apple Computer, Inc. machines.

■ What's your sexual IQ? Challenge Software's Sexware may help you find out. With more than 200 multiple-choice questions, "you and your friends will be amused and educated as you check out your sex IQ" for $39.95.

■ And finally, if the new year has you in a philosophical mood, MIT professor Kerson Huang has developed an on-line version of the venerable *I Ching*, one of the oldest books known to man. For $69.95, the user can consult the *I Ching* "as oracle."

Let's raise a new year's toast to innovation.

Prime unveils PL/I compiler

NATICK, Mass. — Prime Computer, Inc. has announced a full-function PL/I compiler that runs on its superminicomputers.

The product conforms to the ANSI X3.53 1976 and ISO 6160 standards.

Previously, Prime had announced its PL/I Subset G compiler. That product included most but not all of the ISO- and ANSI-specified functions. The new PL/I compiler is source and object code compatible with the earlier product. PL/I can execute PL/I Subset G code at faster speeds; in some cases, there is an 18-fold increase in execution, according to Prime.

The compiler works with Prime's DBG source-level debugger and provides call compatibility with Prime's Cobol 74, Fortran 77, Pascal and RPG-II. All Prime compilers share the same interface to the Primos operating system . The PL/I compiler includes extensions that make it compatible with IBM PL/I compilers that use SELECT and LEAVE statements.

A version of the product that runs on Prime's 2000 series of superminicomputers costs $4,000. A version for Prime's 9000 series sells for $7,000. For $65 a month, a user can take out an optional maintenance service.

INSTANT ANALYSIS

"Acquisitions are strange. It takes a while to learn how to do them well. I don't believe in loading on a whole bunch of packages every year just to widen your product line. That approach is not going to be very successful."

— **Frank Dodge, president, McCormack & Dodge**

On-line retrieval package debuts

GRANADA HILLS, Calif. — Sterling Software's Dylakor Division has introduced an on-line information retrieval package that works with IBM's IMS data base management system.

DYL-Inquiry/IMS enables a user to build and store various inquiry routines. Also, a user can use inquiry parameters with a number of applications. It enables a user to use all IMS capabilities.

The product supplies security procedures so that a systems programmer can limit files, records or fields that a user can access. It was designed for use in an information center environment.

DYL-Inquiry/IMS works with IMS/DC and IMS/VS and runs under IBM's TSO. It costs $40,000. Maintenance services are available for 10% of the purchase price.

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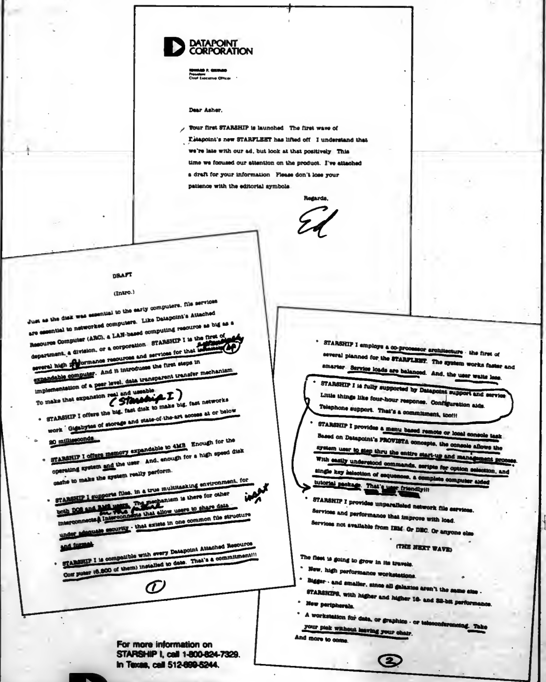

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MICROCOMPUTERS

SMALL TALK
Eric Bender
CW Senior Editor

Token of compatibility?

Let's start the new year on a note of mild speculation: Will IBM-compatible personal computers run without modification on the Token-Ring local-area network?

With hundreds of thousands of those micros installed in the large corporations that are now looking at the Token-Ring, this is not necessarily a trivial question. But because the Token-Ring comes from IBM and is currently in beta tests, it's impossible to get an official answer now.

Everyone agrees that the machines should run on the Token-Ring, and this may well be a total nonissue.

But maybe not. The last time IBM introduced a local-area net for micros, compatible systems weren't necessarily compatible. Compaq Computer Corp. — usually considered the standard-bearer in compatibility — had to revise the BIOS chip in its machines to accommodate IBM's PC Network.

A month ago I began calling various network gurus and industry executives to pose the question. The reaction was relatively uniform: After commiserating on the heavy burden of paranoia that journalists must carry through their lives, they all said; Why, yes, compatibles should run.

Of course, machines that should run frequently send computer staffs screaming over the edge into gibbering incoherency. And the experts did come up with several scenarios in which systems might not work on the Token-Ring.

"In our own experience designing cards for the IBM PC and AT, we find they don't always run on compatibles,"

See TOKEN page 97

Odesta adds Helix twists

Application environment available for Apple Mac

By Eric Bender

NORTHBROOK, Ill. — Double Helix, an application environment for the Apple Computer, Inc. Macintosh, was announced last month by Odesta Corp. The $495 package, an enhanced version of the Helix package first offered a year ago, will debut along with a runtime version.

Designed to exploit the Macintosh's graphics interface fully, the Helix family lets users handle applications building, data base management and other tasks through a set of seven basic icons and pull-down menus. Users can create applications by linking icons in a "visual flow chart," according to the company.

Based on a relational data base management system, Helix software lets users enter all data once and then use it anywhere in the system, with dynamic updating. Users may enter, query, edit and print information all from one window, without changing modes. "We wanted to avoid a modal environment; your head doesn't work in modes," commented Odesta President Daniel Cheifetz.

Scheduled for delivery last month to existing Helix users and for general availability this month, Double Helix adds passwords, custom menus, several global commands and the ability to use subforms (forms within other forms or lists within lists). Performance also has been optimized over that of Helix Release 2, Cheifetz said.

The package received good reviews from some analysts, although they suggested that its sales may be limited because it does not run on IBM micros. "It's a nice product, but they're stuck in a Mac-limited market," commented Michael Goulde of the Yankee Group in Boston.

Offering a runtime version was "somewhat apart from our original idea," Chei-

See ODESTA page 96

INSIDE

AST Research's add-in board combines features of four display adapters/97

INSTANT ANALYSIS

"AT&T has to decide how open the Starlan system is. They're doing very little to promote it as a standard."

— Gail James, CEO, Software Connections

Cygnet stays afloat by marketing separate Cosystem components

By Peggy Watt

SUNNYVALE, Calif. — After starting out at one end of the microcomputer market with its integrated voice/data workstation, the Cosystem, Cygnet Technologies, Inc. is chasing the other end of the rainbow by dismantling and selling the Cosystem concept piece by piece.

Cygnet's flexibility has kept the company afloat in a sluggish market, acknowledged Ken Dickens, marketing manager for the firm. Sometimes start-up companies "come up with grandiose plans and are not able to slow the engine" when the target market does not materialize, he remarked.

The $1,895, 2-year-old Cosystem is a telephone attachment for a Microsoft Corp. MS-DOS microcomputer system with software to integrate voice and data functions. Its features include a 1,200 bit/sec. modem, an on-line calendar, speed and redialing from a data base, a speakerphone and electronic mail between other Cosystems or to on-line services.

Today, the under-$100 component products are selling more widely and serve as an introduction to Cygnet as well, Dickens said.

"The decision was dictated by the condition of the market," said Federico Faggin, Cygnet founder and president. "It was not a difficult decision."

"The Little Black Book," released last April, was plucked directly from the Cosystem directory. Its data base of addresses and telephone numbers can be dialed by modem at the touch of a function key. The traveling computer user can also print out data base's contents, fold and cut on the

See CYGNET page 96

Computer Associates upgrades project management package

Superproject Plus adds analysis tools

By Peggy Watt

SAN JOSE, Calif. — Computer Associates International, Inc. this month will ship Superproject Plus, an upgrade to its year-old project management software, which allows users to tailor resource and task management features for many jobs.

The $495 package includes a resource calendar, reverse scheduling, sort-and-select codes for resource and task management, resource leveling with "what-if" analysis tools, and budget and cost management schedules, according to marketing manager Nancy Twomey.

Users can produce presentation-quality reports, create interactive Pert charts, graph the critical path method and trade data with other office programs like Computer Associates International's Supercalc3, Ashton-Tate's Dbase III and Lotus Development Corp.'s 1-2-3.

Superproject Plus' resource management section helps define resources, charts scheduling, graphs time-allocation needs and work hour assignments and can be graphed in Gantt displays. "You can take it to whatever detail you want," Twomey said.

"It's one awesome product," said beta tester Len Glauber, a project management trainer with AHED Associates, Inc. in San Francisco. Glauber found the most noteworthy new features to be the capability to review multiple products, resource leveling and the package's report-generating ability, particularly the Select capability that controls report design.

Very few project management programs have anything comparable to Superproject Plus' individual resource calendar, which charts a worker's participation in multiple projects and the time spent on each and adjusts the assignments with each scheduling change, Glauber added.

The new release replaces both Superproject 1, released in December 1984, and Superproject 1.1, released in July. Users of Superproject 1 can upgrade to the newest release for $50 and the return of their original disk; 1.1 users can upgrade for free. Site licenses are available.

Twomey said that Computer Associates International is eyeing Fortune 1,000 businesses in a variety of fields, where Superproject has already made inroads "because absolute controls and reporting are generally applied in large organizations more heavily."

Besides serving a host of fields, the program can aid users of varying skills. Superproject Plus offers beginning, intermediate and expert modes, an optional 10-minute introductory "tour" and on-line Help.

The previous release was strong in stand-alone projects but "didn't give the real-life power for a resource management tool." Instead, it predominantly offered reporting and utility-related support, Twomey said.

The software runs on the IBM Personal Computer, Personal Computer XT and AT and compatible systems under IBM PC-DOS 2 or later releases. It requires 312K bytes of random-access memory and two disk drives.

Cygnet sells components

From page 95

dotted lines and slip the printout into a pocket-size black book for use without a micro.

Recent "Little Black Book" enhancements include a separately purchased file conversion program that accepts data from many other data bases and a label maker printing utility. The copy-protected "Little Black Book" sells for $49.95, and a non-copy-protected version costs $69.95. The Label Maker is priced at $29.95, and the File Converter costs $19.95.

Most recently culled from the Cosystem is Get, an electronic mail retrieval program that runs under most applications and logs on automatically to on-line services and flashes a "mail waiting" message for manual retrieval. Cygnet is still targeting corporate users and will tailor Get to retrieve E-mail from a business' internal system.

The program will sell for $49.95 for the first month after it ships in February, but Cygnet promises the price will remain under $100 after that initial promotion. Site licenses are also available.

While there are still salable features to be picked from the Cosystem, Cygnet officials said they are biding their time for the integrated telephone/computer system's heyday.

"The market in the last couple of years has simply slowed down for any personal computers," Faggin said. "The user community appears to be less interested in new things. There is a new class of users who are not nearly as proficient as the first."

Users also have difficulties in understanding the benefits of integrating voice and data, he commented.

Cygnet brushes off apparent competition like Rolm Corp.'s several voice/data systems and Compaq Telecommunications Corp.'s Telecompaq.

The Rolm instruments must be hooked up to a Rolm private branch exchange, Dickens pointed out. And the Telecompaq, "by having it all in one, does not take advantage of the installed base of computers," Faggin maintained.

The influx of local-area networks may also spur the Cosystem, as corporate users become accustomed to E-mail, the firm said. Cosystem could connect geographically separate offices that each have installed a net.

Faggin estimated it will take a year or two for the voice/data market to open "and probably years before the onset of a vigorous market."

At Cygnet itself, where all 20-some employees use have the Cosystem on their desks, "There's no such thing as a paper memo," he added.

Odesta adds Helix twist

From page 95

fetz noted. "The system should be flexible enough to change on a day-to-day basis."

However, the runtime version answers requests from applications developers, he said. The cost is $500 for 10 runtime packages.

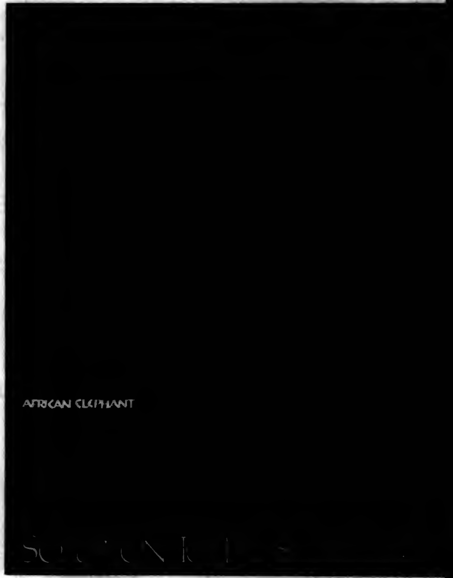
Veteran Helix user Gary Ingram of Nite and Day Power Technologies in Davenport, Calif., gave Double Helix a favorable review. "Double Helix gives the additional advantage of lists within lists and lets you know what options to select next," he noted. "It's also much, much faster than Release 2."

Ingram, a software consultant whose recent Helix jobs included one data base system that tracks a houseboat rebuilding project and another that supports billing for physicians, said the runtime offering is important for development.

"However, there's always somebody who wants something else, and you've got to go back," he said. "That's the beauty of Helix; you can change it."

Odesta will continue to offer the basic Helix package, which costs $395. An upgrade to Double Helix will be priced at $180.

The firm is finishing up work on a multiuser version, scheduled for demonstration this month and shipment in February, "which will run over Appletalk without any file server required," Cheifetz said.



AST micro adapter card bows

IRVINE, Calif. — A new add-in board from AST Research, Inc. combines the features of four display adapters to provide high-resolution graphics, sharp text generation and high-end color capabilities for users of IBM Personal Computers and compatibles, an AST company spokesman said.

The AST-3G single-slot adapter card is fully compatible with software written for the IBM Enhanced Graphics Adapter (EGA), the IBM Color/Graphics Adapter, the IBM Monochrome Display and the Hercules Computer Products, Inc. graphics card, according to Tony Paradiso, senior product manager for AST's personal workstation equipment group. The card also comes with a standard parallel printer port.

Scheduled to ship in 1986

Scheduled to begin shipping in the first quarter of 1986 and priced at $600 fully configured, the AST-3G card is reportedly intended for use primarily with programs that employ both text and graphics images, such as Lotus Development Corp.'s 1-2-3 and Symphony.

The product will solve the problem of having to compromise text quality for color graphics capability, Paradiso claimed.

In addition to its parallel printer port and Hercules compatibility, both lacking in IBM's EGA card, the AST-3G sports another advantage over the IBM product, according to Paradiso.

The EGA card needs a piggyback board to upgrade its graphics memory from 64K to 256K bytes, but the AST-3G comes in either configuration and can be changed simply by switching chips.

Designed for the IBM Personal Computer, XT, AT and compatibles operating PC-DOS version 2 or above, the AST-3G reportedly works in conjunction with the IBM 5151 monochrome monitor, 5153 color monitor or 5154 enhanced color monitor as well as with compatible display units.

Choose tape only or tape plus 25, 35, [illegible] hard disk.

Token of compatibility

From page 95

commented Harry Saal, Nestar Systems, Inc. founder. "There are problems with bus timing and things like that."

"Theoretically they should work; the interface is clean," said Harvey Freedman, vice-president at Architecture Technology Corp. The only possible hang-up that comes to mind, he added, is that IBM and compatibles might want to hold the Token-Ring adapter program in different memory locations.

"It should plug and play, but we all know from the compatible world that you can have slight compatibility problems," said 3Com Corp.'s Howard Charney, senior vice-president and general manager of the network systems division. He emphasized, however, that he has heard of absolutely no difficulties to date.

"There are no known problems," said Lance Hansche, chairman of Phoenix Software Associates Ltd.

No one suggested that IBM would deliberately throw in a monkey wrench designed to keep compatible systems off the Token-Ring network.

"The people who are responsible for this product really would like to see it widely used," Saal said. "They would be very disappointed if it didn't work on compatibles."

However, almost no one expected that Big Blue made much of an effort to check it out.

"I doubt very much they would do that," Hansche said. "They would figure their only responsibility to the industry in general is to remain internally consistent."

Naturally, everyone made the somewhat disingenuous suggestion of asking IBM about all this. IBM, as usual, declined to comment in any meaningful way.

So there we have it for the moment: most likely, compatibles will run just fine on the Token-Ring. Well, it *should* turn out that way.

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DATA STREAM
John Dix
and Paul Korzeniowski

Local nets top year-end trends

By the end of this new year, the installed base of personal computers will approach the number of all conventional display terminals in use. This fact, coupled with the need to provide terminal users with access to multiple hosts, is driving the development of local communications options.

Significant strides were made in the past year. A stellar example: 138,000 local networks were installed in 1985, a 35% gain over the previous year, according to Kim Myhre, director of communications research at International Data Corp., a market research firm in Framingham, Mass.

Some other 1985 developments in local communications are as follows:

- AT&T Information Systems and Northern Telecom, Inc., manufacturers of private branch exchanges, announced the ability to support IBM 3270-type synchronous devices, as did Sytek, Inc. and Ungermann-Bass, Inc., both manufacturers of broadband facilitywide local nets.
- Network management systems for local nets debuted, facilitating the often underestimated task of network maintenance, control and management.
- Larger capacity, more capable net servers bowed, some providing more than 1G-byte of hard-disk storage.
- Use of twisted-pair wire to support data terminal equipment was endorsed by IBM through a Cabling System enhancement.

Perhaps the most important development of 1985 in regard to local communications was the introduction of the IBM Token-Ring network. While limited to IBM Personal Computer support as introduced, it will be fleshed out this year to support many other devices. More importantly, the Token-Ring will galvanize the industry and create a standard that others can emulate and compete against on a feature-for-feature basis. Big Blue has knighted the concept, and now the fun will really begin.

AT&T starts construction of dedicated DOD network

By Bryan Wilkins

WASHINGTON, D.C. — AT&T has begun construction of a dedicated network that in the course of 10 years could cost $400 million and is being projected as a prototype of the dedicated networks it plans to build for corporate America.

The client in this first effort is the U.S. Department of Defense, which recently signed AT&T to a 10-year contract to construct the Defense Commercial Telecommunications Network (DCTN). The network will carry voice, data and video over an all-digital network.

The control of the network will be centered in AT&T facilities in Dranesville, Va., where a software-driven cluster of computers will dynamically route, select and perform network circuit management for the Defense Communications Agency (DCA), which will tie into the network from Arlington, Va.

The Network Control Center operations will be run on three AT&T 3B20 superminicomputers whose software has been reengineered from existing network management software used in AT&T's public network. DCA will not dynamically control circuit use but will be able to monitor network health, said Rich Adleman, head of the AT&T Bell Laboratories department that designed the network for DCA.

The network will consist of 15 nodes, each outfitted with an AT&T 5ESS, AT&T's newest central office stored-program switch. These nodes, which will be interconnected primarily with satellite links and some microwave shots, will support 150 DCTN user locations. Fourteen of the 5ESS switches will be located on U.S. military bases, and one will be partially used in the public net.

The network is slated to carry digitized voice traffic at 64K bit/sec. or 32K bit/sec. if bit compression is used. Data rates will range from 75 bit/sec. to 4.8K bit/sec. across the switched portion of the network, and on the reserved or dedicated portions the data will travel at 1.5M bit/sec.

Video communications key

An important feature of the DCTN network for DCA is its video communications, using bit-compression multiplexers to double channel capacity without degradation of signal. The DCA will be able to transmit video signals at 1.5M bit/sec., which will control costs for a service that requires large amounts of bandwidth. The video services will encompass conventional two-way point-to-point teleconferencing as well as point to multipoint. The DCTN teleconference service will give the controller the ability to select screens for display at all teleconference sites and also to bridge the audio feed from all points participating in the video conference.

Broadband digital encryption will be performed on the internodal links to secure the communications in the network.

DCTN will connect Defense Department installations across the U.S. and will cover 85,000 miles, AT&T said.

INSTANT ANALYSIS

"Users are more sophisticated than they have been. They want to buy solutions to problems, not the technology that makes the solution."

— Alan Schoevitz, director of the San Francisco office of Network Strategies, Inc., a communications consultancy

MCI challenges Megacom service

By Bryan Wilkins

WASHINGTON, D.C. — MCI Communications Corp. said last week it will introduce Prism I, a bulk calling option styled after AT&T's recently announced Megacom service. Prism I, targeted at companies with monthly telephone bills exceeding $12,000, will be priced 10% lower than AT&T's Megacom.

MCI said pricing for the service, if approved by the Federal Communications Commission, will be set at 16 to 26 cents per minute, with a monthly recurring charge of $1,000. MCI said these rates compare with AT&T's Megacom tariff of 18 to 35 cents per minute and a $1,200 monthly recurring charge.

MCI said the service is different from AT&T's Megacom in that the pricing is distance sensitive, meaning the customer will pay a flat per-minute charge based on its distance, compared with AT&T's tariffs, which specify mileage bands.

"With traditional WATS, many customers require sophisticated analysis of telephone traffic to optimize their savings. This is eliminated with Prism I," said Vorder Bruegge, MCI's senior vice-president of national accounts.

MCI Prism I will be available Jan. 1.

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SYSTEMS & PERIPHERALS

HARD TALK
James Connolly
CW Senior Editor

Growing pains of disk capacity

Like the newborn child who is a sign that the family is prospering, the addition of new applications and new employees may indicate that a business is booming. But a new baby or new business can lead to an unexpected expense — adding a room to the house.

In the corporate world, that new room is often an addition to the DP center and is required not because the company needs more processing power but because its disk storage has outgrown the computer room.

Managing direct-access storage device (DASD) capacity was a key issue at a recent Computer Measurement Group, Inc. conference in Dallas.

Coping with DASD growth and managing existing disk capacity are likely to remain major concerns of all DP managers for many years.

Market research figures showing 40% to 50% annual growth in DASD capacity become frightening when a manager who already has 60G bytes of DASD looks at the $416,900 price tag on a 5.04G-byte string of dual density IBM 3380 Model E disk drives.

"There is a general trend out there as people get into capacity planning for DASD, and it is because most organizations are going to more and more on-line environments," noted International Data Corp. analyst Steve Josselyn.

Understanding business needs

Josselyn said that the challenge for managers is understanding the needs of their own businesses. "The whole organization has to realize, and is starting to realize, that there is a necessity not only to keep MIS informed of what they are doing, but for MIS' input. That way the user isn't just coming in and saying that he needs a string of 3380s and that he needs it right away," he added.

The question of how the spread of personal computers will impact the computer room further complicates the planning process. Few managers know how users of the personal computers being tied into their mainframes will use storage and host CPU power.

The need for the MIS manager to become involved in the business as a whole — a theme echoed almost daily in the corporate world — is best illustrated in capacity planning issues.

Managers who are concerned about the growing number of users with on-line access need to have a say when decisions are made about what type of access new classes of users will have. They also need to be involved in the planning process long before implementation of corporate expansions or relocations.

Surprises are the last thing managers need, particularly when each new box takes up valuable floor space, personnel costs and a healthy chunk of corporate revenue.

ETA sells unannounced unit

Group inks $20 million pact to buy supercomputer

By James Connolly

PRINCETON, N.J. — Although the product is not scheduled to be announced until the spring of 1986, the first ETA Systems, Inc. ETA 10-8 supercomputer has been ordered by the Consortium for Scientific Computing (CSC).

The consortium, which is establishing a federally funded supercomputing center, recently took the uncommon step of signing a $20 million contract to buy the long-rumored but unannounced system from ETA.

> ***The consortium took the uncommon step of signing a $20 million contract to buy ETA's unannounced system.***

"Our application for our supercomputer center was specifically directed to ETA Systems, so we are just following through on the natural course of what was in the application and was approved by the National Science Foundation," CSC representative Charlaine Ewan explained.

Officials at ETA Systems, which was spun off from Control Data Corp. in 1983, said they expect to introduce officially the ETA 10 family in the spring of 1986 for delivery later this year.

According to ETA Systems, the ETA 10 line will allow use of up to 10 processors. Ewan said the consortium expects delivery of its ETA 10-8 in March 1987. That ETA 10-8 reportedly will perform up to 10 billion arithmetic operations per second.

Until that system is delivered, the consortium of 13 educational institutions will reportedly use an ETA Cyber 205 as the key system in its John von Neumann Center in Princeton.

The consortium is supported by five-year grants from the National Science Foundation and the state of New Jersey and is intended to support research for academic and commercial uses.

INSTANT ANALYSIS

"The importance of capacity planning is directly related to the importance an organization places on computing."

— Fred Pirnan, senior vice-president for Humana Corp.

Ultimate 7000 superminis bow

By James Connolly

EAST HANOVER, N.J. — Ultimate Corp. has introduced its Ultimate 7000 series of 32-bit superminicomputers, based on Honeywell, Inc. DPS 6 minicomputer hardware and Ultimate's 15X coprocessor subsystem.

The series includes three systems, Ultimate Models 7000, 7200 and 7400. The 7400 supports up to 500 terminals, according to the company. The systems reportedly provide at least twice the performance of the existing Ultimate 6000 Series.

The systems are intended to provide computing power as current Ultimate users' companies grow and to help Ultimate compete for larger accounts, according to a company official. Customers reportedly can upgrade their existing Series 6000 to Series 7000 machines through board swaps.

A spokesman said the 7000 series is particularly suited for customers with heavy transaction processing requirements. The systems run the Ultimate operating system, Ultimate's SMA Standard version of Pick Systems Pick operating system.

The Model 7000 supports up to 250 users and features 4M to 8M bytes of memory, a 515M-byte disk drive, a 20-slot chassis and 32 ports. A basic configuration costs $310,000.

The Model 7200 features 4M to 8M bytes of memory, 40 slots, 96 ports and a 515M-byte disk drive. A basic configuration costs $545,000.

The Model 7400, which is a dual processor version of the Model 7000, features 8M bytes of memory, 40 slots, 128 ports and two 515M-byte disk drives. A basic configuration costs $545,000.

The company said the Model 7200 can be upgraded to a Model 7400. The systems will be available in April.

Philips Peripherals unwraps seven printers

By Donna Raimondi

SAN FRANCISCO — Philips Peripherals, Inc. has unwrapped six impact printers and one nonimpact printer.

Four of the printers were designed for use with the IBM Personal Computer, a spokesman said. The highest speed new printer, the GP 480 L, was designed for users who spool their printing and do not want contention problems.

The impact printer announcement included the following:

- The GP 480 L general office printer for minicomputers and microcomputers, which costs $2,795 and has 95 character designs and sizes. It prints up to 120 char./sec. of correspondence-quality text and 480 char./sec. at draft quality. In graphics mode, the printer features single-pass dot resolutions of 18 by 60 dots and up to 144 by 144 or 72 by 72 dot/in.
- The GP 300 LC dot matrix business or scientific printer, which costs $3,300. The printer runs at 120 char./sec. at letter quality and 300 char./sec. in draft mode and has a four-color ribbon and graphics capabilities.
- Four IBM Personal Computer-compatible printers for text and graphics, including the GP 150-PC ($1,700), GP 300-PC ($1,900), GP 300 L ($2,300) and GP 300 LC-PC ($2,800). The printers are based on the company's serial dot matrix technology.

The GP 150-PC prints at 120 char./sec. draft speed and 60 char./sec. letter-quality speed. The other three printers have speeds of 300 char./sec. in draft mode and 80 char./sec. in letter mode. The GP 300 LC-PC provides full-color capabilities.

Also announced was the Elpho 20 nonimpact page matrix printer that uses electrophotographic recording technology. It can print 20 page/min using cut sheet plain paper, transparencies or labels in a variety of sizes. The unit is suited for use in a clustered workstation environment, the vendor said. Base price is $19,800.

All of the printers are available with serial or parallel ports.

Performance Monitoring of Non-IBM Databases

COMPUTER INDUSTRY

ACTIVE ISSUES
Kathy Porteus

Stock market rings in 1986

Wishes for a prosperous and healthy new year may be granted as the stock market's glowing performance of recent weeks looks as if it will continue into 1986.

Propelling the move in technology issues is the overall stock market rally that began in September. Until now, stellar performances in the technology sector have been mostly limited to large capitalization companies such as IBM (New York Stock Exchange — 153¾) and Digital Equipment Corp. (NYSE — 131¼). Analysts say that they are hopeful, though still uncertain, that small capitalization or secondary issues will fully participate in this rally.

The current surge in stock prices reflects several developments. According to Thomas Linkas, a senior security analyst who covers high-technology special situations for Goldman, Sachs & Co., business conditions are marginally better; companies have downsized their operations by at least 10%, enabling greater profitability and higher earnings, and the Federal Reserve Board is "pumping money into the U.S. economy at a time when the supply of equity has shrunk." Lower interest rates and a weaker U.S. dollar are also considered factors driving the rally.

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CBEMA vs. deregulation

Industry group urges FCC to retain subsidiary rule

By Bryan Wilkins

WASHINGTON, D.C. — The computer industry is nervously watching the Federal Communications Commission as it prepares to decide the ground rules for letting local telephone companies into "enhanced" data communications while they still retain a franchise monopoly to deliver telephone services.

The Third Computer Inquiry, as proposed by the FCC, would loosen the current rule that all unregulated services must be offered through a separate subsidiary, much as AT&T provides data processing communications through AT&T Information Systems.

The FCC's plan would permit the local telephone companies into this new market for delivering services that alter the content of messages through protocol conversion and computer processing. The market is expected to grow substantially and spawn an array of new services for large and small computer users.

The Computer and Business Equipment Manufacturers Association (CBEMA), which represents IBM, Digital Equipment Corp., Burroughs Corp., Honeywell, Inc. and other major equipment vendors, has urged the FCC to retain the separate subsidiary requirement for dominant carriers such as the seven regional holding companies.

Vico Henriques, CBEMA president, said recently, "We believe in competition and encourage it. But we're saying to the FCC, 'before you do away with the separation rules, you have to address the technical issue of network changes, the access of other competitive businesses to the exchange and the protection of proprietary customer data.'"

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INDUSTRY NOTES

Walker exec joins Boole & Babbage

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Telex to buy United Technologies unit

TULSA, Okla. — Telex Computer Products, Inc., a subsidiary of Telex Corp., announced plans to purchase the assets of United Technologies Communications Co., a unit of United Technologies Corp. of Hartford, Conn., for $30 million in cash and notes.

United Technologies Communications sells private branch exchanges — including two proprietary systems, the UTX 1001 and UTX 1200/5000 — and other telecommunications products. Since October, the company has openly been seeking a buyer.

Meanwhile, Telex Computer, a manufacturer of terminals, controllers and printers for the IBM 3270 market, has had plans to enter the voice/data transmission market.

Cautiously optimistic, analysts await fourth-quarter results

Industry upturn strong, accelerating, some say

By Edward Warner
Computerworld News Service

Though some have hailed IBM's modest third-quarter profit as a sign of a coming end to the computer industry slump, most computer industry market analysts say they are reserving judgment until financial reports arrive from 1985's fourth quarter or from the first quarter of 1986.

According to Don Bellomy, associate editor of the "EDP Industry Report" for International Data Corp. in Framingham, Mass., the true test of whether the downturn in computer industry sales has ended will come from a reading of the fourth-quarter financial reports. Until then, he elaborated, nothing can be said with certainty, despite IBM's improved performance.

"IBM's latest fiscal statement made me realize how bad they were hurting," Bellomy said. He said the initial shipment of IBM's 3090 Series 200 — the Sierra — mainframe should have had a bigger impact on the company's bottom line, which showed sales only 2% above the second-quarter level. But he said that third-quarter earnings indicate that the worst is over for Big Blue, and similar positive signs are appearing on the ledgers of other firms that were less hard hit.

Signs of improvement were also seen by Oscar Rothenbuecher, a senior staff member at Arthur D. Little, Inc., a Cambridge, Mass., consulting firm. Like IBM, he said, both Burroughs Corp. and Sperry Corp. began shipping new high-end machines in the last quarter; resultant sales should enliven the sluggish revenue streams of all three, he added.

"The upturn is beginning and accelerating," Rothenbuecher observed. "It is already very strong."

Analyst Eric Arnum, though, said he plans to reserve judgment until he sees the computer industry financial reports for the first quarter of 1986. That quarter will tell the tale, said Arnum of International Resource Development, Inc. in Norwalk, Conn., because by then customers will have set their capital spending levels for the year. Such spending includes computer equipment purchases and is highly dependent on what sort of tax bill is approved by the U.S. Congress. The Reagan tax proposal, he said, would favor capital spending and thus improve the computer industry's prospects for the year.

Without a capital spending tax break, however, Arnum said things could just as easily remain sour for the computer industry. He cited a June International Resource Development report in which major computer industry customers said they planned to keep their capital spending at 1984's level.

At least one analyst, however, said he believed this year's downturn in sales is really no slump at all. Sonny Monosson, president of American Computer Group, Inc. in Boston, is a veteran consultant on Digital Equipment Corp. systems and a computer dealer.

"The last three or four months were the best in our history," Monosson enthused. The slump, he said, exists only in the minds of those who cannot accept a semipermanent sales plateau, which is a sign that the industry has become mature and the market has become nearly saturated.

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CBEMA vs. deregulation

From page 105

enhanced services by regulated revenue from basic telephone service.

The FCC's new policy plan would permit telephone companies to offer data communications services, such as voice storage, protocol conversion and network terminating equipment at a customer's office, jointly with regular telephone service if there is sufficient competition within the region to be served by the new service. If there is not sufficient competition, the FCC would require an accounting regime to separate costs, but no subsidiary.

CBEMA calls the FCC proposal "impractical and unworkable" and said major questions have to be answered before it can be adopted. CBEMA recommended that the FCC "fine-tune and build upon the existing regulatory framework," keeping the structural separation of basic and enhanced services.

The association said the FCC would face the problem of assigning a regulatory definition to each new service proposed by a dominant telephone company, which in turn would affect how it would be regulated, maybe postponing the service itself.

Perhaps the most worrisome aspect of the proposed FCC ground rules is the practical issue of protecting customer proprietary information and interconnection to the local telephone facilities, CBEMA said.

Many computer companies are customers of the telephone company and need the local services to deliver their own services to the end user. "CBEMA submits that, as long as bottleneck facility carriers retain such special market power, additional regulatory protections . . . must be considered to ensure that the bottleneck facility be shared fairly," the association told the FCC.

CBEMA voiced concern about the disclosure of network changes, which affect the connection of equipment to the local exchange, to the telephone company's competitors. CBEMA's concern was mirrored in similar comments filed by the Association of Data Processing Services Organizations, Inc., the Independent Data Communications Manufacturers Association and IBM, all of which urged the FCC not to abandon the enhanced/basic definition for new services.

Notes: Xidex buys group

From page 105

indicted in connection with a federal contract {CW, Dec. 23], last month announced the creation of two management positions that will enable **Robert S. Wiggins**, Paradyne's **chairman, president and chief executive officer**, "to devote more time to strategic planning and defining the company's corporate growth objectives." **Jerry T. Kendall** was promoted to **executive vice-president and chief operating officer**, while **Chief Financial Officer Fred T. Melberg** assumed additional duties as **executive vice-president and chief staff officer**.

■

Xidex Corp. last month concluded an agreement to buy the magnetic media portion of the **Business Products Group of Control Data Corp.'s Peripheral Products Co.** for about $65 million.

■

In another sale, **California Devices, Inc.** announced it exercised an option to acquire **Storage Technology Corp.**'s wafer fabrication facility located in Louisville, Colo.

Stock market rings in 1986

From page 105

computer slump is ending, primarily because the news has stopped getting worse. However, Steve Milunovich, a technology analyst with First Boston Corp., says, "The fundamentals of technology companies haven't really changed even though the stocks are going nuts."

Milunovich says, "Orders need to basically improve" for the drive in technology stocks to continue. Linkas says he believes "a broad and sustained upturn in corporate profits — and hence demand for high-technology goods — looks probable in the second half of 1986."

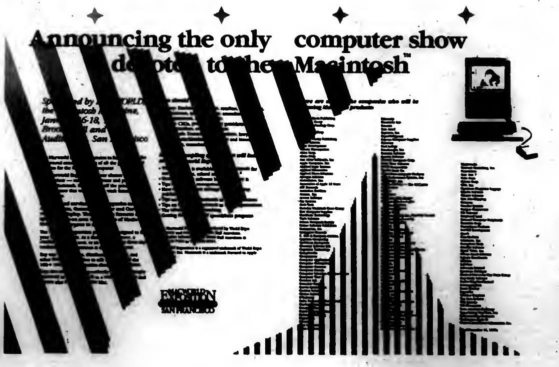
After several weeks of soaring prices, where are new investment opportunities to be found?

Michael R. Weisberg, director of technology research with Prudential-Bache Securities, Inc. maintains that "some of the companies that have already done well will continue to be the leaders in this rally." On Weisberg's list of strongest computer stocks are IBM; DEC; Tandem Computers, Inc. (over-the-counter — 21¾); Intergraph Corp. (OTC — 35¾); Computer Associates International, Inc. (OTC — 33); and General Motors Corp. E class (NYSE — 42). Weisberg adds, "If I were investing money right now, I'd be buying stocks."

Rich Edwards, an analyst with Robertson, Coleman & Stephens of San Francisco, contends the market will continue to be selective, favoring only certain technology issues. On his list are specialized firms that avoided the industry slump, namely Cray Research, Inc. (NYSE — 63¾); Stratus Computer, Inc. (OTC — 23); and Symbolics, Inc. (OTC — 13¾).

Edwards says companies like IBM and DEC, which are "coming off of a very strong new product cycle" are the likeliest candidates to score gains. On the other hand, he suggests, companies without new product lines, such as Hewlett-Packard Co. (NYSE — 36¾), have not performed as well.

Linkas of Goldman Sachs says he believes that smaller capitalization companies are "beginning to get included in the rally." He currently recommends General Instrument Corp. (NYSE — 17¼) as a second-tier technology stock that should perform well during the coming weeks.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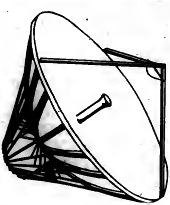

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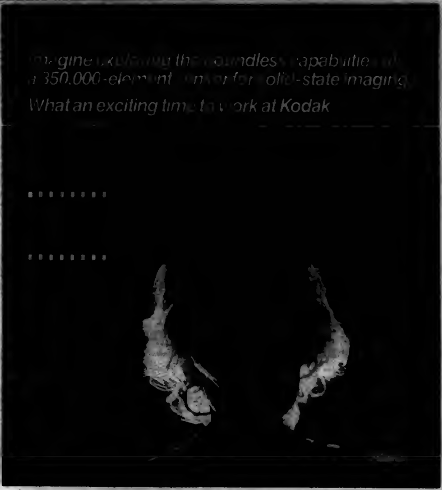
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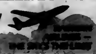
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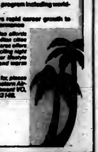

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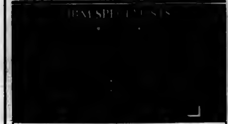
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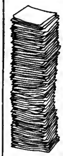

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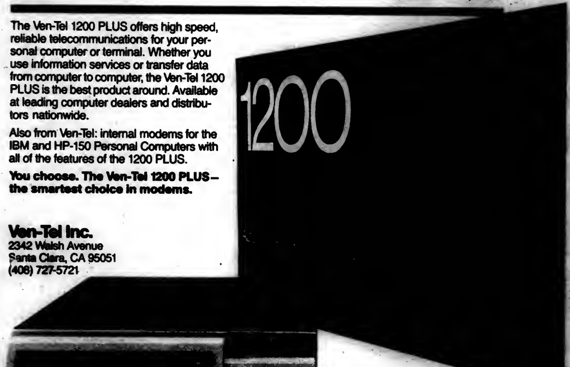

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